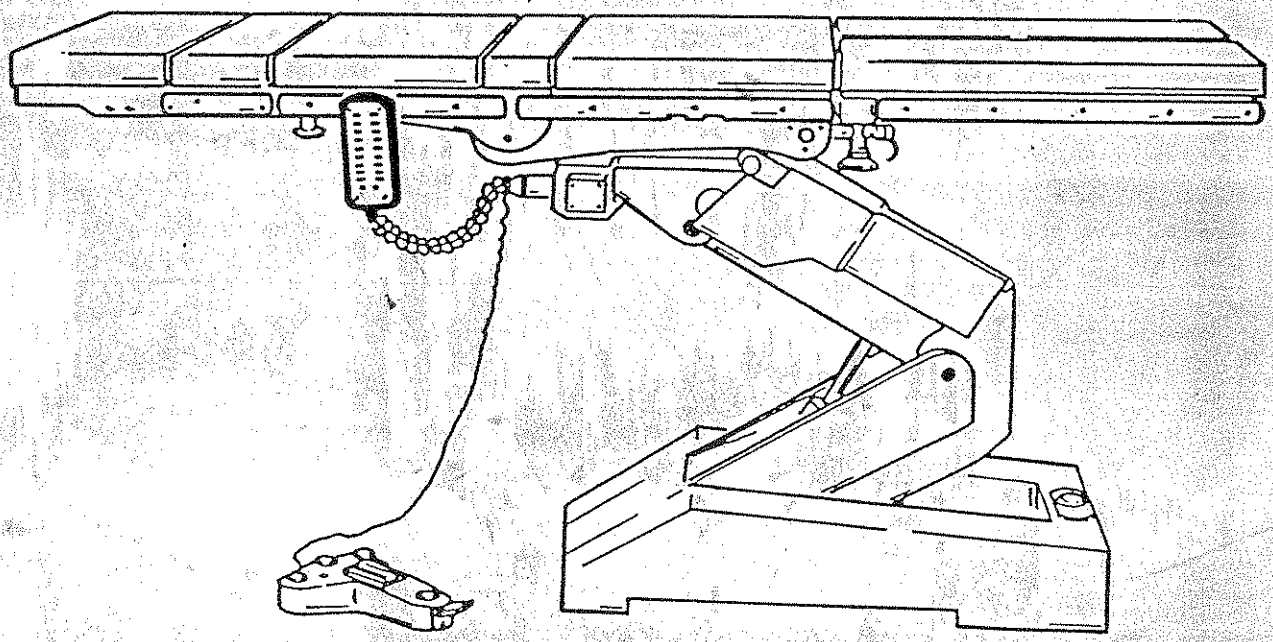
SKYTRON

GRAND RAPIDS, MICHIGAN

Maintenance Manual



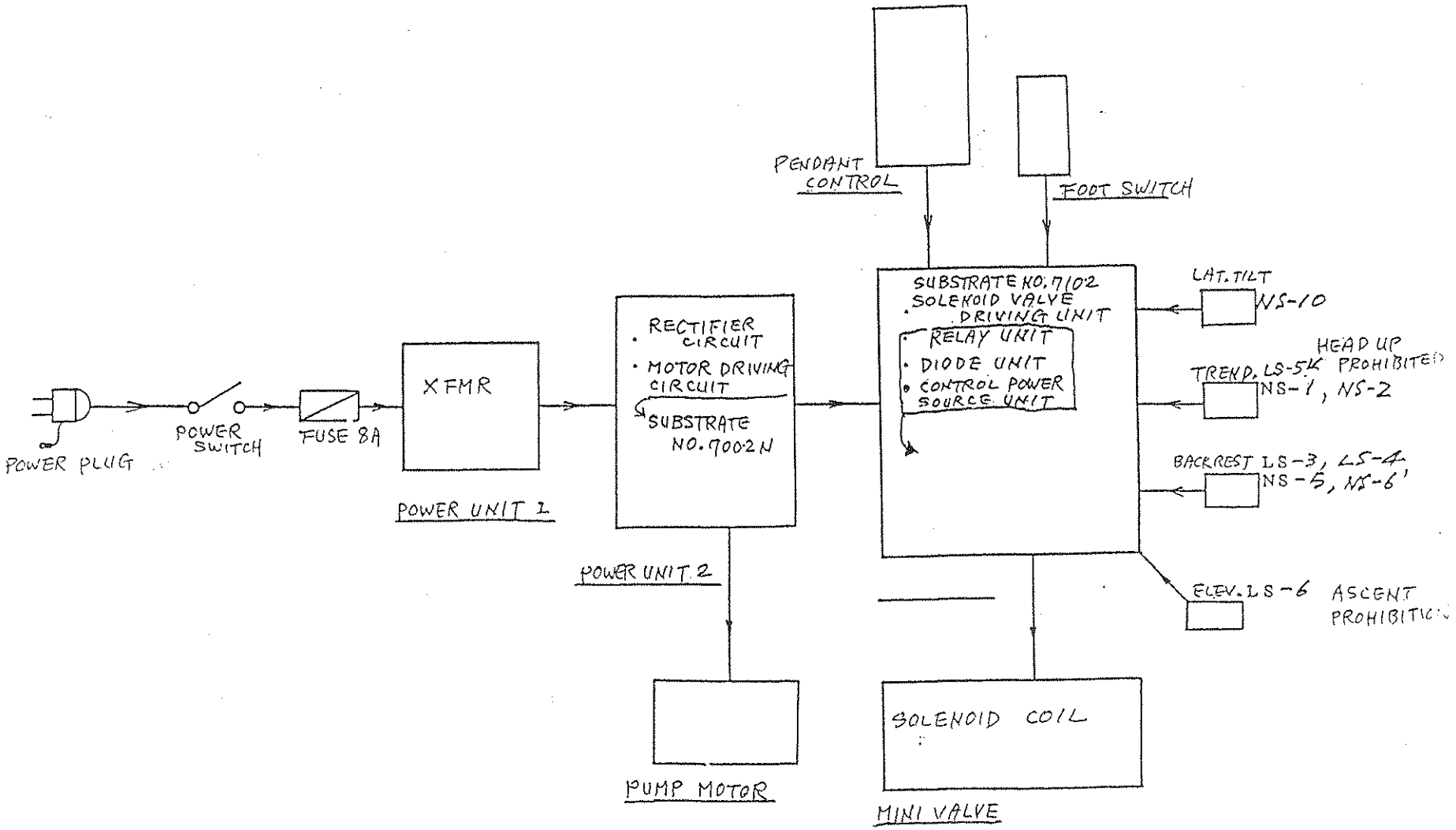
MODEL 7000
MICRO SURGERY OPERATING TABLE

MODEL MST-7000NB

A. A diagram of the whole electric system of this surgical operation table is shown in Fig. 1.
The electric system may be divided into five units of operation; the detection, control, driving and power units.

1. Power unit ----- Cord, power switch, fuse, transformer, rectifier
2. Operation unit - Operation box, foot switch
3. Control unit --- Pump motor driving circuit, solenoid valve driving unit, control unit (control power, relay, diode)
4. Detection unit - Each limit switch, each horizontal return switch
5. Driving unit --- Pump motor, solenoid valve

The electrical requirement of the operation table is 120V, 5A, 60Hz. The main power switch is at the rear section of the leg table. The length of power cord is approx. 15 feet.
Current leakage is less than 100 A.



DRAWING-1 MST-7000 ELECTRICAL SYSTEM CHART
(FIG-J)

B. Explanation of each unit

1. Power unit -- Cord, power switch, fuse, transformer, rectifier
   Since this operation table is controled and driven with DC power, AC 120V is input, and it activates with DC 25V and DC 28 - 35V.

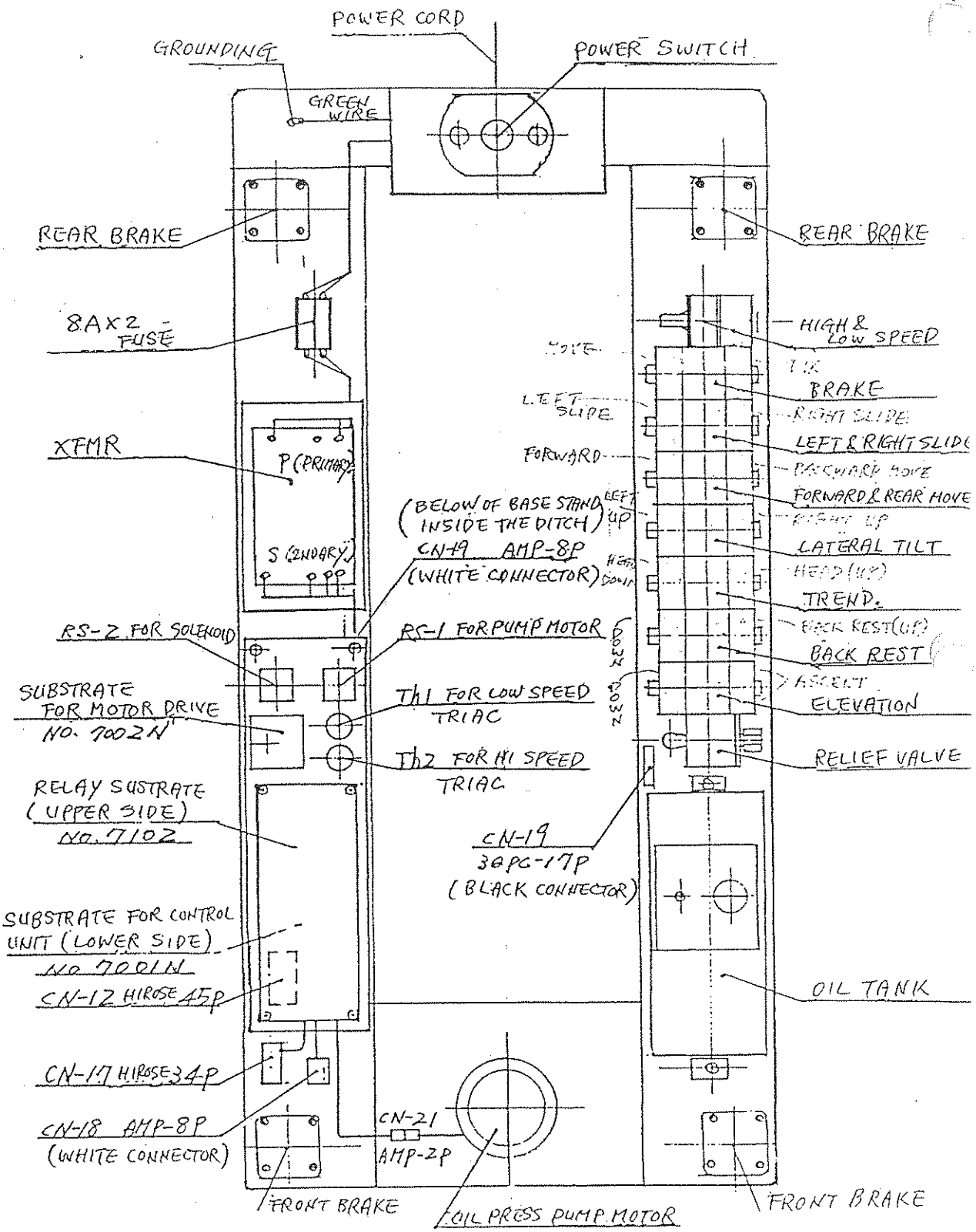
2. Operation unit -- Operation box, foot switch
   This unit transmits signals to activate the pump motor and the solenoid valve. The microswitch is built in and DC 25V power is used.

3. Control unit -- Pump motor driving circuit, solenoid valve driving unit, control unit
   This unit receives signals from the operation unit and the detection unit to actually activate the pump motor and the solenoid valve.

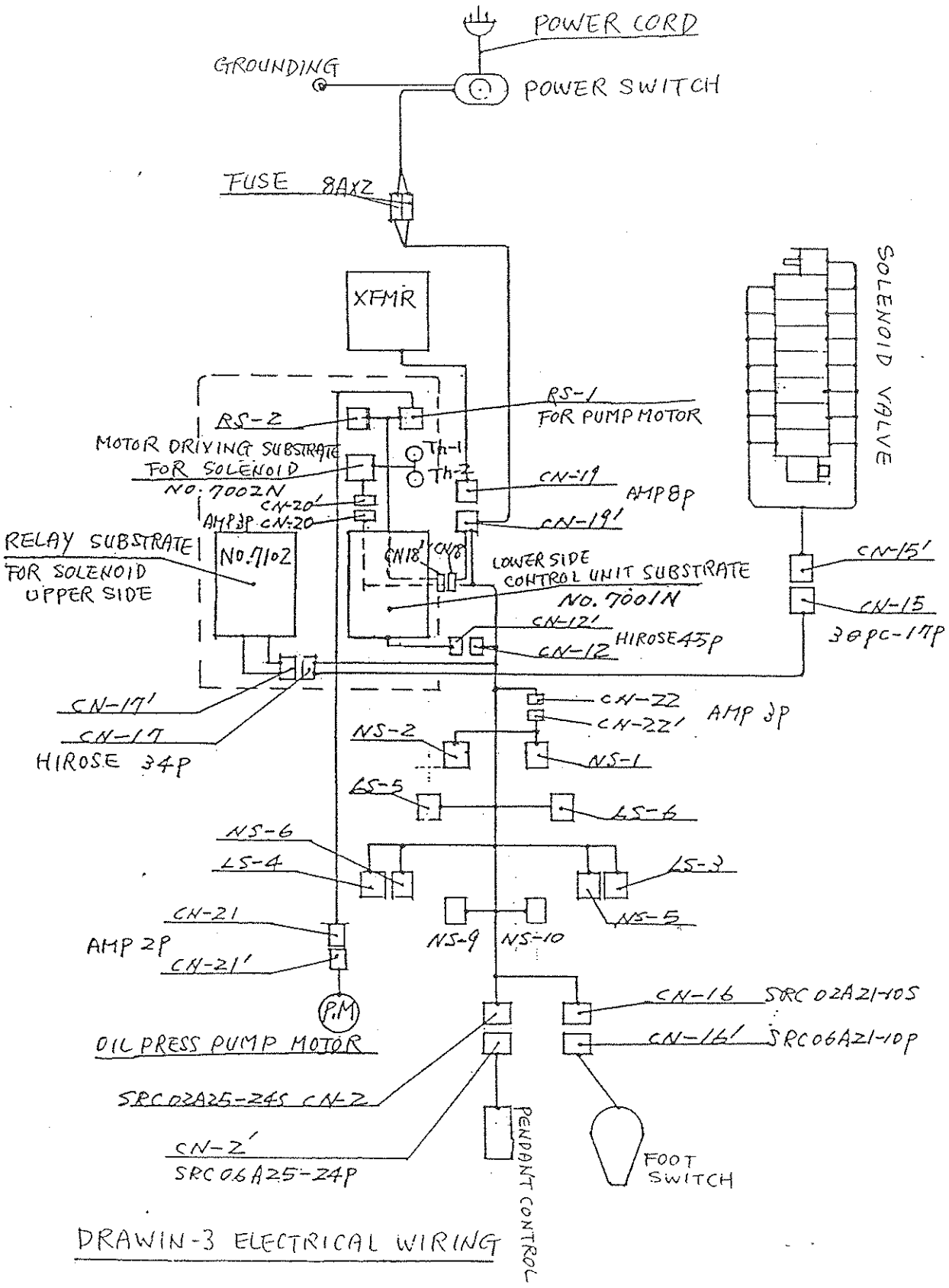
4. Detection unit -- Each limit switch, each horizontal return switch (LS, NS)
   This unit judges the angle and horizontality of signals coming from the detection unit to enter them into the control unit.

5. Driving unit -- Pump motor, solenoid valve
   After receiving input for activation from the control unit, this unit actually drives the operation table.

The locations and connections of the units described above are shown in Fig. 2 and Fig. 3.
In Fig. 2, the right and left stainless steel covers of the leg table and the solenoid valve cover have been removed.
Fig. 3 shows the electric wiring system.



DRAWING-2 ARRANGEMENT OF ELECTRICAL PART



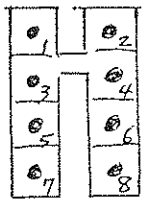
DRAWIN-3 ELECTRICAL WIRING

C. Power unit check

Check if AC 120V is input to the transformer through the power switch, fuse, etc. and the transformer, rectifier, etc. are outputting properly.

1. RE CONNECTOR CN-19'

CREAM-WHITE COLORED NYLON CONNECTOR



CONNECTOR (SOCKET CONTACTS)
CN-19'

TABLE 1

+ TESTER READ	− TESTER READ	METER INDICATION
1	2	∞
1	3 ~ 8	∞
2	3 ~ 8	∞
3	4	20KΩ ~ ∞
8	5	∞
8	6	∞
8	7	∞

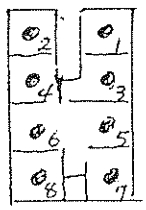
TABLE 2

When power is ON, Meter is AC's V Range

TESTER READ (+)	TESTER READ (−)	METER INDICATION
1	2	115 V

2. RE CONNECTOR CN-19 (CHECK ON POWER SOURCE XFMR UNIT)

CREAM-WHITE COLORED NYLON CONNECTOR



CONNECTOR (PIN CONTACTS)
CN.-19

TABLE 3

INPUT POWER SOURCE OFF, METER RESISTANCE RANGE

+ TESTER READ	− TESTER READ	METER INDICATION
1	2	APPROX 0.9 Ω
3	4	" 1.7 Ω
8	5	" 0.3 Ω
8	6	" 0.3 Ω
8	7	0.3 Ω

3. The power transformer

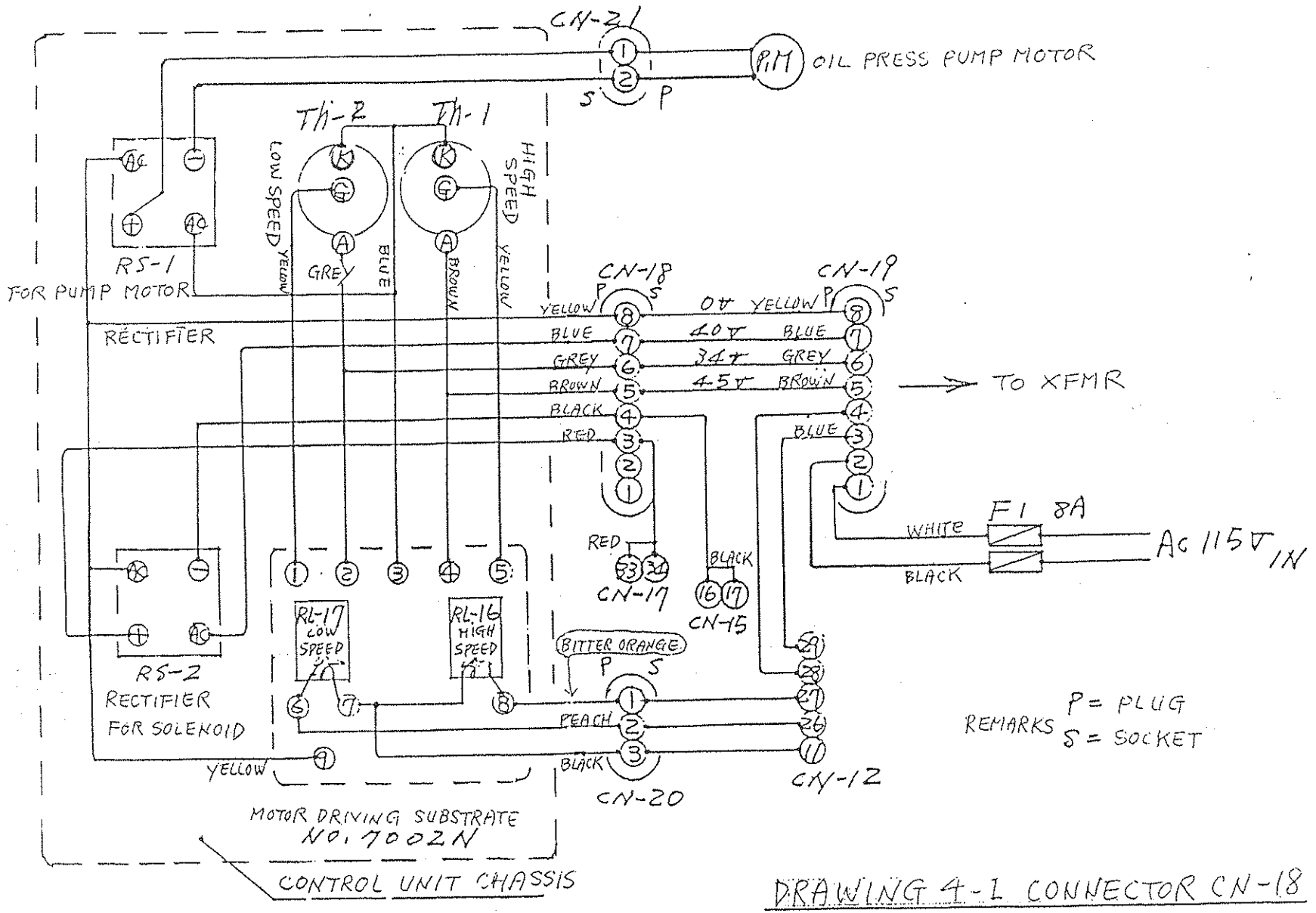
If the check shows that connecters CN-19 and CN-19' are good, it will be necessary to actually input AC 120V and check input/output at the power transformer.

Confirm the position of the transformer in Fig. 2 and remove the cover. Connecters CN-19 and CN-19' should be left connected.

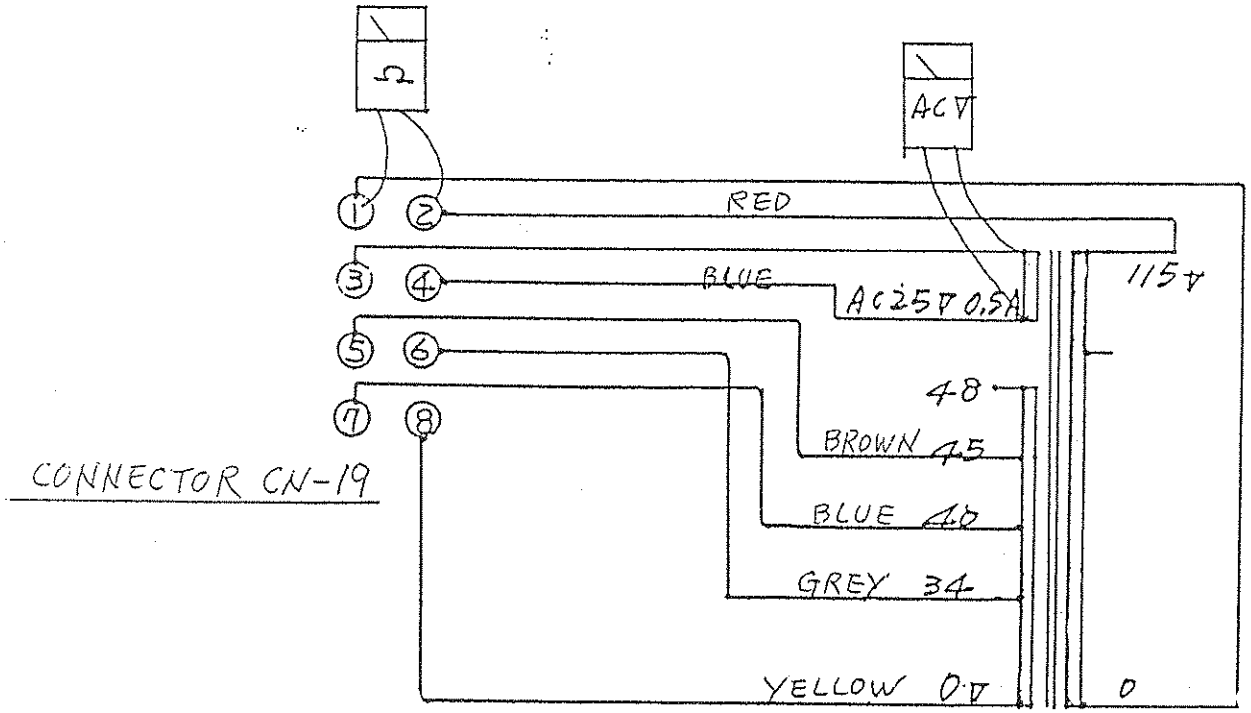
Referring to Fig. 4, check the voltage of each input/output with the tester ACV range. Confirm that:

Output is AC 25V, AC 34V, AC 40V, AC 45V

Input is AC 120V.



DRAWING 4-1 CONNECTOR CN-18



DRAWING 4-2 CONNECTOR CN-19 & TRANSFORMER

D. Operation unit check

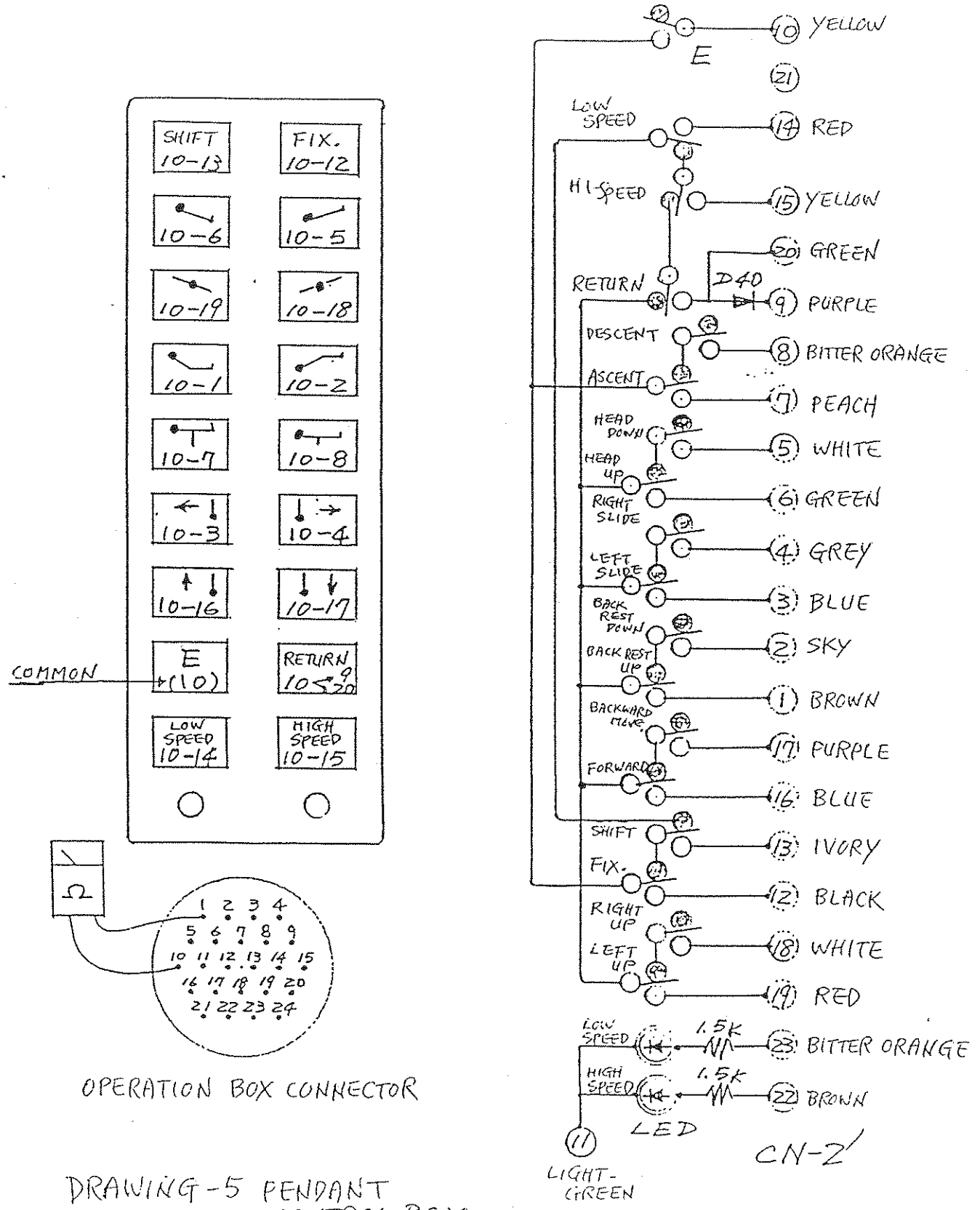
This unit transmits signals to actually activate the surgical operation table. An operation box and foot switch comprise this unit.

1. The operation box

Each function is activated by pressing the appropriate button on this box. Changes between LOW SPEED and HIGH SPEED can be made too.
A change is confirmed by the lamps at the right and left of the box.
If for example performing a TRENDELENBURG, two buttons like the ABOVE HEAD and UNDER HEAD are pressed simultaneously, no trouble ill occur because whichever has priority will function.

2. Operation box connecter CN-2'

CN-2' is a connecter and is connected by a spiral cord to the operation box.
To ascertain whether the interior of the box is good or not check connecter CN-2'. Check while referring to Fig. 5. Connect the tester lead, and take measurements while pressing the corresponding buttons.



OPERATION BOX CONNECTOR

DRAWING-5 PENDANT CONTROL BOX

TABLE 4

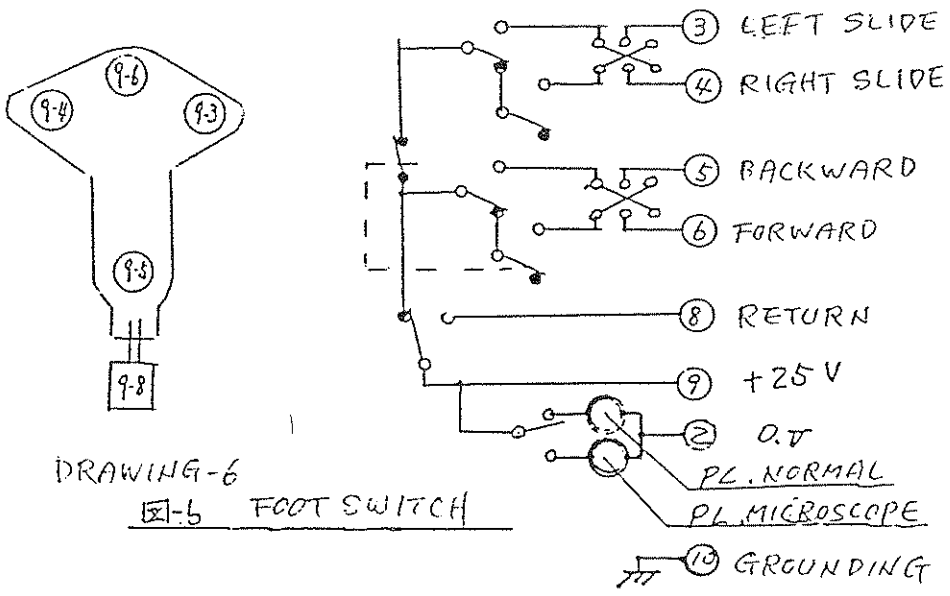
− TESTER READ	+ TESTER READ	METER INDICATION	BUTTONS TO BE PRESSED
1	10	0 Ω	BACK REST UP
2	10	0 Ω	" DOWN
3	10	0 Ω	LEFT SLIDE
4	10	0 Ω	RIGHT "
5	10	0 Ω	HEAD DOWN
6	10	0 Ω	" UP
7	10	0 Ω	ASCENT
8	10	0 Ω	DESCENT
9	10	20 Ω	RETURN
10			
11			
12	10	0 Ω	FIXATION
13	10	0 Ω	SHIFT
14	10	0 Ω	LOW SPEED
15	10	0 Ω	HIGH SPEED
16	10	0 Ω	FORWARD
17	10	0 Ω	BACKWARD
18	10	0 Ω	RIGHT UP
19	10	0 Ω	LEFT UP
20	10	0 Ω	BACK REST RETURN

REMARKS: EVERY NUMBERS ARE TERMINAL NUMBERS BELONGS TO CONNECTOR CN-19'

"E" Button must be pressed simultaneously

3. Foot switch

This switch is used to activate the surgical operation table with your foot. HORIZONTAL/VERTICAL SLIDE and RETURN can be activated. Only the backplate can not be made horizontal, even if the RETURN switch is pressed.



DRAWING-6

図-5 FOOT SWITCH

RE FOOT SWITCH CONNECTOR M'

TABLE 5

+ TESTER READ	− TESTER READ	METER INDICATION	BUTTONS TO BE PRESSED
9	3	0 Ω	LEFT SLIDE
9	4	0 Ω	RIGHT SLIDE
9	5	0 Ω	BACKWARD
9	6	0 Ω	FORWARD
9	8	0 Ω	RETURN

TESTER RESISTANCE RAN

E. Control unit check

1. Motor driving circuit

The motor driving circuit is impressed as shown in Fig. 4, with DC 45V for high speed and DC 34V for low speed.

Switching is made to the pump motor with Relays RL-16 and RL-17, and the AC power from the TRIAC is input afterbeing rectified by Rectifier RS-1.

In the pump motor, red is + and black is −.

2. Base plate of control unit

This base plate consists of:

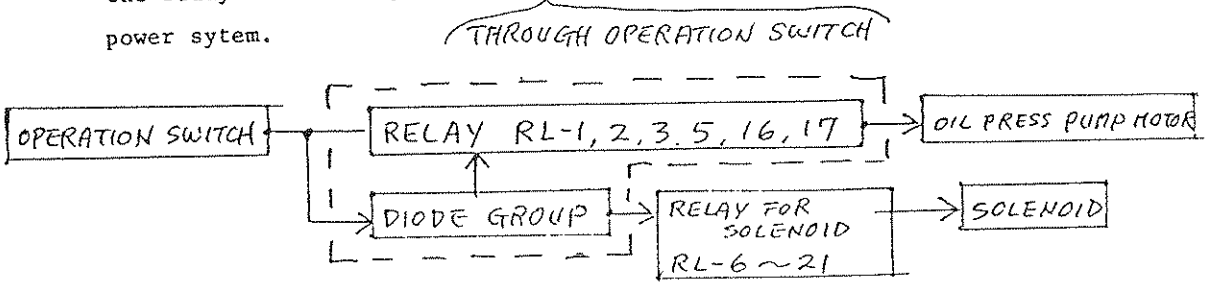
A. Control power

B. RL-1 Relay for low speed memory, RL-2 Relay for high speed change, and RL-3.

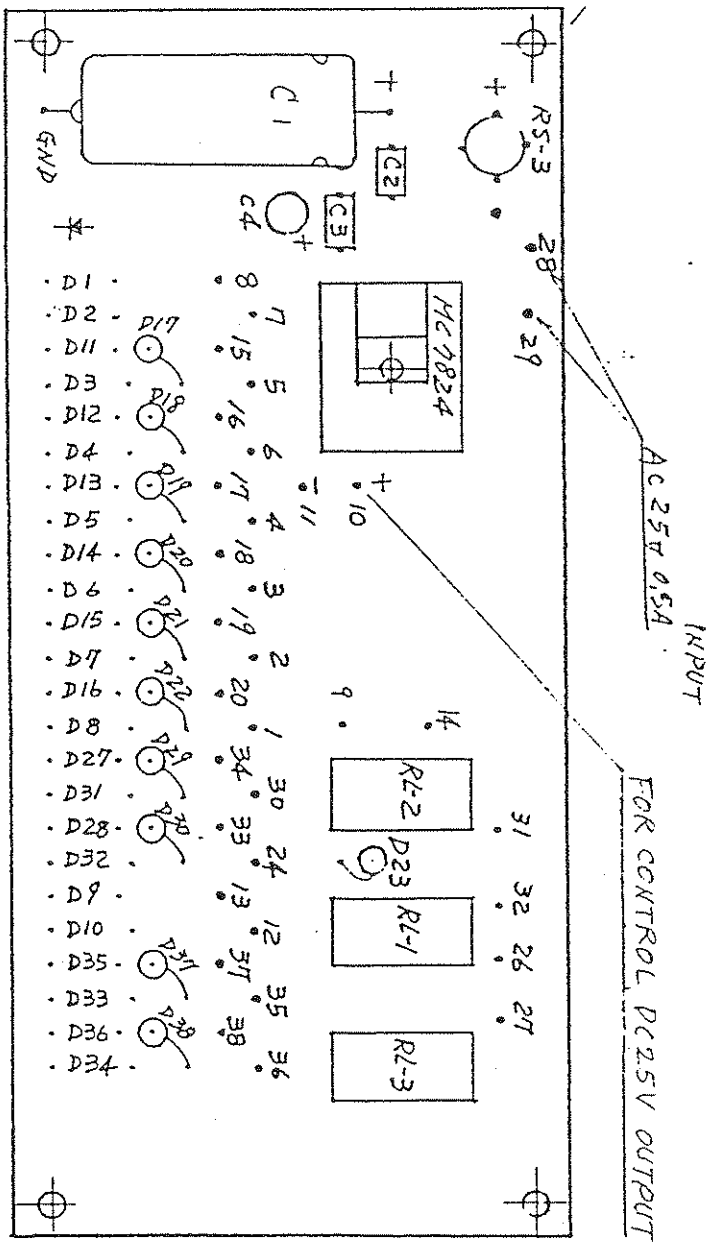
C. A group of diodes.

For details, see Fig. 7.

The control power unit supplies the power to activate the solenoid and the relay drive the pump motor, and is independent from the motive power sytem.



The whole flow is as shown above. The base plate of the control unit is in the dotted line, and is input/output by Connecter CN-12'.



REMARKS: NUMBERS OTHER THAN PARTS NUMBERS ARE BELONGS TO 'CN-12'

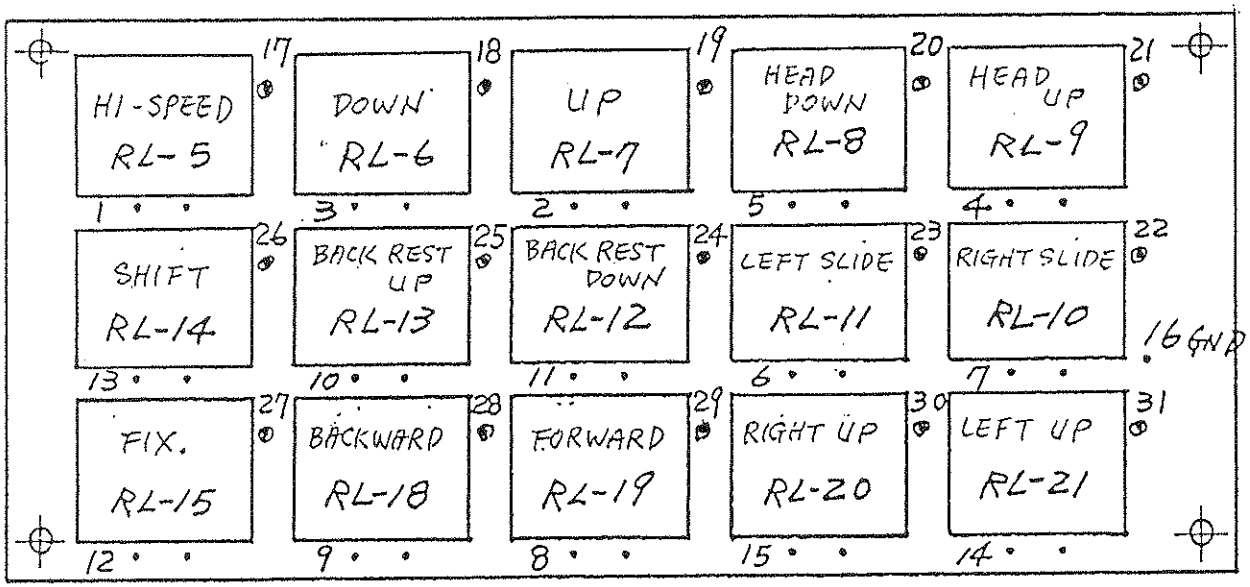
DRAWING-1 CONTROL, BASE PLATE NO. 7001N

3. Solenoid valve driving unit
(Relay base plate No. 7102)

This base plate is activated by signals output from the Base plate of control unit CN-12, and drives each solenoid valve.

For details, see Fig. 8.

DRAWING-8 SOLENOID VALVE DRIVING BASE PLATE



Remarks: NUMBERS other than Parts numbers are Pin numbers of CN-17'.
Ⓡ mark is connected to the coil of Relay.

CN-19' PIN 16 CONTROL GROUNDING

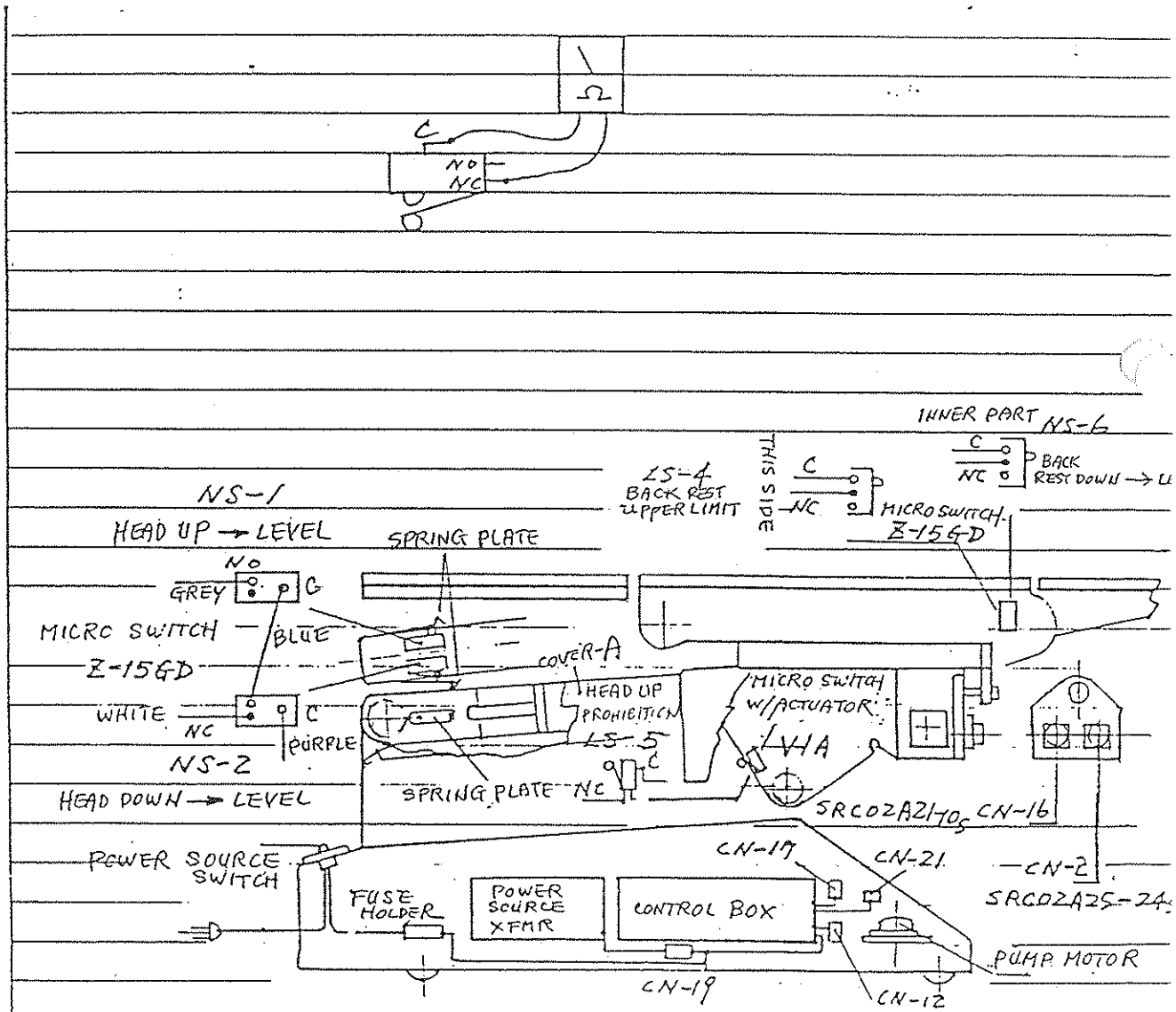
CN-19' PIN 33, 34 DRIVING +B

F. Detection unit check

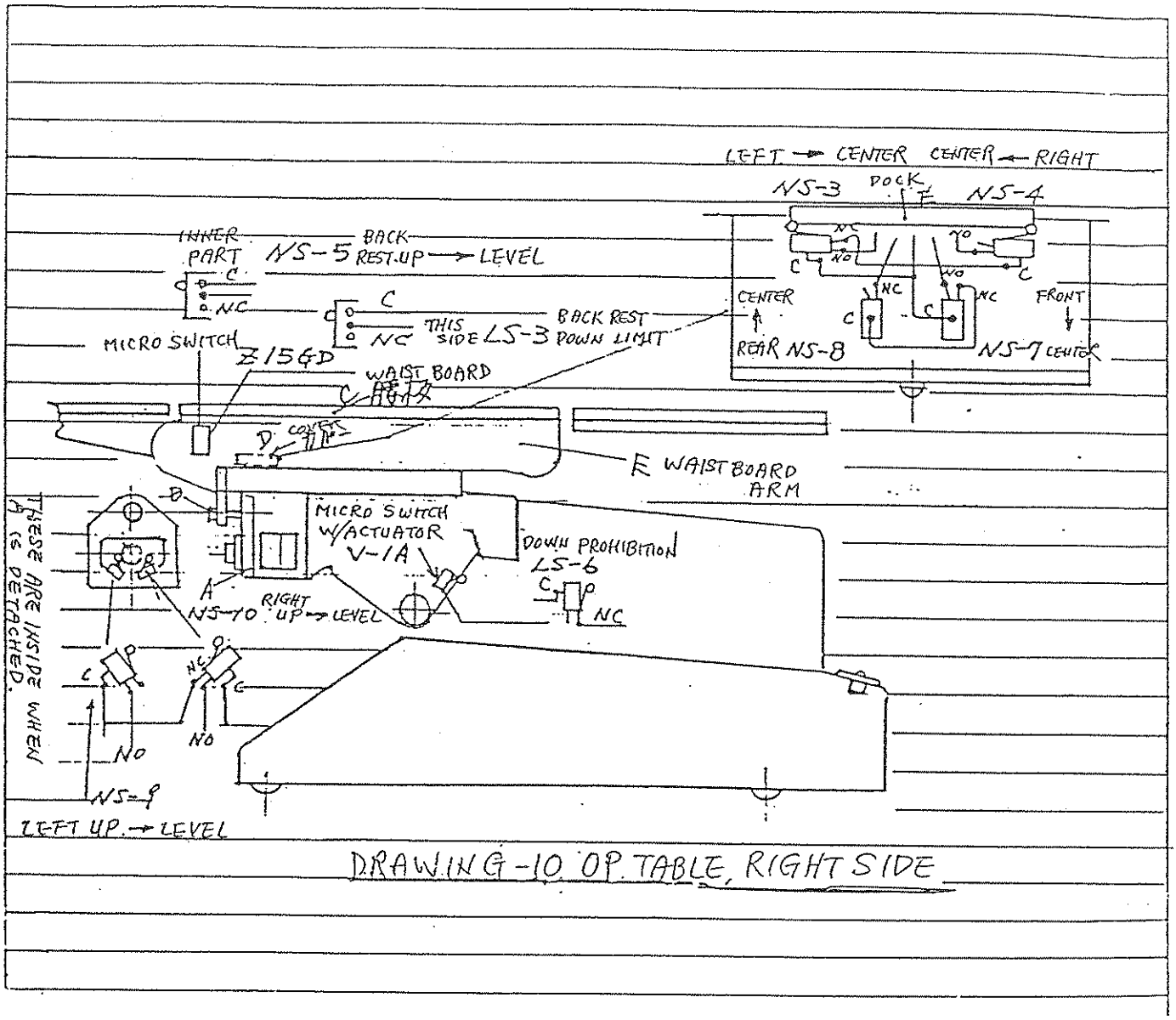
This check is made for both the horizontal return switch NS and Limit switch LS. There are two methods. One is to check each individual switch unit, and the other is to check the wiring system including between the connecter terminals.

1. When NS and LS are checked individually

Fig. 9 and Fig. 10 show the positions of these switches. Press the tester leads to C, NO and NC of the switch, and check the ON and OFF condition of the switches.



DRAWING-9 JP TABLE, LEFT SIDE



DRAWING G-10 OP. TABLE, RIGHT SIDE

2. Sections including wiring

Referring to Fig. 3, wirecut check can be made between all other terminals with connecters CN-12, 17, 22, 16, 2, 18, and 19.

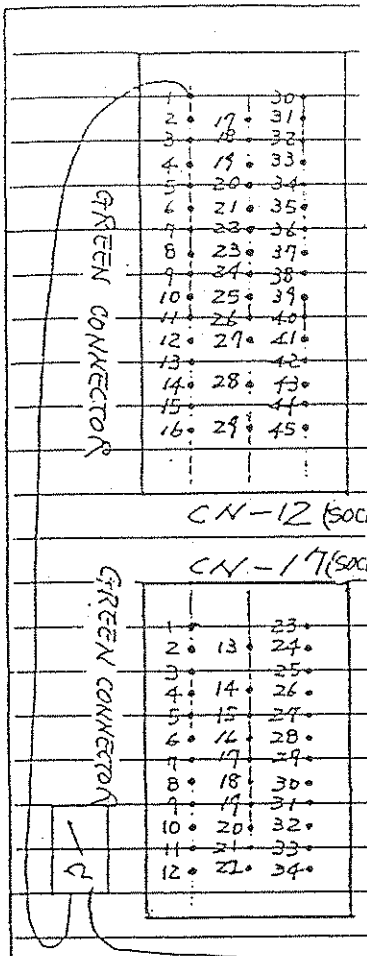
Tables 6 - 11 show their check lists.

Connecters CN-2 and CN-16 appear in Fig. 9.

Wiring with the connector CN-11, CN-12' and other connectors. Green colored 45 Pin connectors.

Check inside wiring and the condition of the switch located in the middle.

check from connector CN-12



Power Source OFF Meter Resistance Range TABLE 6-1

6-1

+ TESTER READ	− TESTER READ	METER INDICATION	SWITCH IN THE MIDDLE	RELATIVE FUNCTION
CN12-1	CN2-1 〃 17-25	0 Ω	LS-4 BACK REST UP LIMIT	BACK REST
2	CN2-2 〃 17-24	0 Ω	LS-3 BACK REST DOWN LIMIT	〃
3	CN2-3 〃 17-23	0 Ω		HORIZONTAL SLIDE
4	CN2-4 〃 16-4 〃 17-22	0 Ω		〃
5	CN2-5 〃 17-20	0 Ω		TREND.
6	CN2-6 〃 17-21	0 Ω	LS-5 HEAD UP PROHIBITION	〃
7	CN2-7 〃 17-19	0 Ω		UP & DOWN
8	CN2-8 〃 17-18	0 Ω	LS-6 DOWN PROHIBITION	〃
9	CN2-15	0 Ω		HI-SPEED CHANGE
10	CN2-18 〃 16-9	0 Ω		CONTROL ⊕
11	CN2-11, CN17-16 〃 16-2, CN20-3	0 Ω		EACH RELAY COIL GROUND
12	CN2-12 〃 17-27	0 Ω		BRAKE
13	CN2-13 〃 17-26	0 Ω		〃
14	CN2-14	0 Ω		LOW SPEED CHANGE
15	CN22-3	∞	NS-1 HEAD UP → LEVEL NS-2 HEAD DOWN → LEVEL	TREND. LEVEL RETURN
16	〃 -2	∞	NS-2 HEAD DOWN → LEVEL	〃
17	CN2-9 〃 16-8	∞	NS-3 LEFT → CENTER	SIDE SLIDE RETURN
18	〃	∞	NS4 RIGHT → CENTER NS3 LEFT → 〃	〃
19	〃	∞	NS5 BACK REST UP → LEVEL	
20	〃	∞	NS6 〃 〃 DOWN → LEVEL	
21	CN2-21	0 Ω		EXTRA WIRE
22				
23	〃			
24	CN2-16, CN17-17 〃 16-6	0 Ω		TREND. SLIDE
25				
26	CN20-2	0 Ω	RL-17	LOW SPEED DRIVE
27	CN17-17 〃 20-1	0 Ω	RL-5 RL-16	SPEED DRIVE.
28	CN19'-4	0 Ω		POWER SOURCE FOR CONTROL AC INPUT
29	〃 -3	0 Ω		〃

- TO BE CONTINUED ON NEXT PAGE -

REMARKS: WHEN CONDUCT THESE MEASUREMENT, TABLE TOP SHOULD BE AT HORIZONTAL LEVEL

CONTINUED FROM PAGE -20-

TABLE 6-1 CONTINUED

+ TESTER READ	− TESTER READ	METER INDICATION	SWITCH IN THE MIDDLE	RELATIVE FUNCTION
CN12-30	CN2-17, CN17-28 // 16-5	0 Ω		TREND. SLIDE
31	CN2-22	0 Ω		HI-SPEED PILOT LAMP
32	CN2-23	0 Ω		LOW SPEED PILOT LAMP
33	CN2-9 // 16-8	∞	NS8 REAR→CENTER NS7 FRONT→ //	TREND. SLIDE RETURN
34	//	∞	NS7 FRONT→CENTER	//
35	CN2-18 // 17-30	0 Ω		LAT. TILT
36	CN2-19 // 17-31	0 Ω		//
37	CN2-20	∞	NS9 RIGHT DOWN→LEVEL NS10 LEFT DOWN→ //	LAT. TILT RETURN
38	//	∞	NS10 LEFT DOWN→LEVEL	//
39	NO CONNECTION			
40	//			
41	//			
42	//			
43	//			
44	//			
45	//			

CHECK FROM CONNECTOR CN-2

TABLE 6-2

+ TESTER READ	− TESTER READ	METER INDICATION	SWITCH IN THE MIDDLE	RELATIVE FUNCTIONS
CN2-9	CN16-8	0 Ω		RETURN BY FOOT SWITCH
//	NS3 C, NO NS7 C, NC	0 Ω		TREND. SLIDE RETURN
CN2-20	NS10 C, NC NS9 C, NC	0 Ω		LAT. TILT RETURN
CN2-24		C Ω		GROUNDING

CHECK ON EACH POWER SOURCE VOLTAGE

INPUT POWER SOURCE ON METER DC RANGE. TABLE-7

+ TESTER READ	− TESTER READ	METER INDICATION	TYPE OF POWER SOURCE	REMARKS
CN12-10	CN12-11	DC 24V	POWER SOURCE FOR CONTROL	CN12
CN17-33, 34	CN18-4	DC 35V	POWER SOURCE FOR BULBS VALVE	CN18

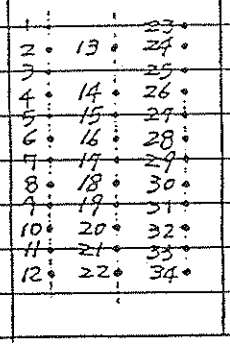
LEAVE THE CONNECTION OF PLUG & SOCKET AS IS

3. Operation units and detection unit to control unit connection check
These connections are made to Connecters CN-17, CN-19, CN-20, and CN-22 especially around CN-12 as well as to CN-15 of solenoid valve.

The check list of connecters not appearing in Table 6 is shown below.

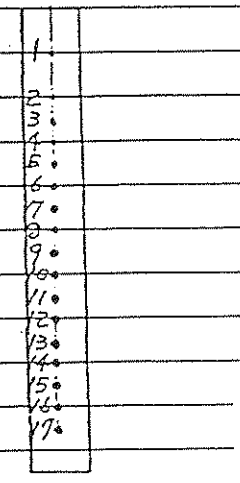
A check centering around Connecter CN-17. (Since checks CN17-17 - 31 are made according to Table 6, the remaining portion is shown in Table 8.) Remove CN17, 17', CN15, 15', and other connecters at the time of measurement.

CN17 SOCKET



INPUT P. SOURCE OFF, TESTER RESISTANCE RANGE TABLE-8

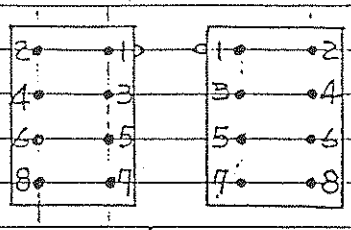
+ TESTER READ	− TESTER READ	METER INDICATION	VALVE
CN17-1	CN15-1	0 Ω	HI-SPEED
〃 2	〃 2	〃	ELEV.
〃 3	〃 3	〃	DESCENT
〃 4	〃 4	〃	HEAD UP
〃 5	〃 5	〃	〃 DOWN
〃 6	〃 6	〃	LEFT SLIDE
〃 7	〃 7	〃	RIGHT SLIDE
〃 8	〃 8	〃	FORWARD
〃 9	〃 9	〃	BACKWARD
〃 10	〃 10	〃	BACK REST UP
〃 11	〃 11	〃	BACK REST DOWN
〃 12	〃 12	〃	FIX.
〃 13	〃 13	〃	SHIFT
〃 14	〃 14	〃	LEFT UP
〃 15	〃 15	〃	RIGHT UP
〃 16	CN12-1?	〃	RELAY COIL GROUND



CN-15
BLACK CONNECTOR
FOR SOLENOID VALVE

REMARKS: MEASUREMENT OF CN-15 AND 15' IS TO BE DONE BY MEANS OF DETACHING EACH PC. SEPARATELY.

CHECK MAINCY CN-18



CN-19' WHITE CONNECTOR (PLUG)

CN-18 WHITE CONNECTOR (SOCKET)

+ TESTER READ	− TESTER READ	METER INDICATION
CN18-1	NO CONNECTION	
2	〃	
3	CN17-33,34	0 Ω
4	CN15-16,17	0 Ω
5	CN19-5	〃
6	〃 -6	〃
7	〃 -7	〃
8	〃 -8	〃

Remarks: Measurement should be done by removing each CN-19 and CN-19' separately.

Also CN-15 and CN-15' should be removed or detached separately.

RE: CONNECTOR CN-15 FOR SOLENOID VALVE

Main power source ON, Measurement to be done by pressing each of the correspond switch buttons. Tester DC V Range

TABLE-10

− TESTER READ	+ TESTER READ	METER INDICATION	BUTTONS TO BE PRESSED
CN15-16,17	CN15-1	35 (V)	HI-SPEED
〃	〃 2	〃	ELEV.
〃	〃 3	〃	DESENT
〃	〃 4	〃	HEAD UP
〃	〃 5	〃	HEAD DOWN
〃	〃 6	〃	LEFT SLIDE
〃	〃 7	〃	RIGHT SLIDE
〃	〃 8	〃	FORWARD MOVE.
〃	〃 9	〃	BACKWARD 〃
〃	〃 10	〃	BACK REST UP
〃	〃 11	〃	〃 DOWN
〃	〃 12	〃	FIXATION
〃	〃 13	〃	SHIFT
〃	〃 14	〃	LEFT UP
〃	〃 15	〃	RIGHT UP

G. Driving unit

1. This unit consists of the pump motor and the solenoid valve. See Fig. 2 for the positions to which they are fixed.
   The check of the pump motor itself is just to check the internal wirecut with the tester resistance range. Approx. 1Ω.

2. The coil of the solenoid valve coil can be checked by inspecting Connecter CN-15 according to Table 11.

   Connecter CN-15'
   Check the wirecut, etc. of the solenoid coil.

TESTER RESISTANCE RANGE TABLE-11

	+ TESTER READ	− TESTER READ	METER INDICATION	
	CN15'-16/17	CN15'-1	38~40Ω	HI-SPEED
	〃	〃 2	〃	ELEV.
	〃	〃 3	〃	DESCENT
	〃	〃 4	〃	HEAD UP
	〃	〃 5	〃	〃 DOWN
	〃	〃 6	〃	LEFT SLIDE
	〃	〃 7	〃	RIGHT 〃
	〃	〃 8	〃	FORWARD MOVE.
	〃	〃 9	〃	BACKWARD 〃
	〃	〃 10	〃	BACK REST UP
	〃	〃 11	〃	〃 DOWN
	〃	〃 12	〃	FIXATION
	〃	〃 13	〃	SHIFT
	〃	〃 14	〃	LEFT UP
	〃	〃 15	〃	RIGHT UP

REMARKS: DRAWING-2 SHOWS THE LOCATION OF VALVE COIL.

The inspection method using a tester on each unit has been shown above but results with the values appearing in the tables, indicate they are normal.

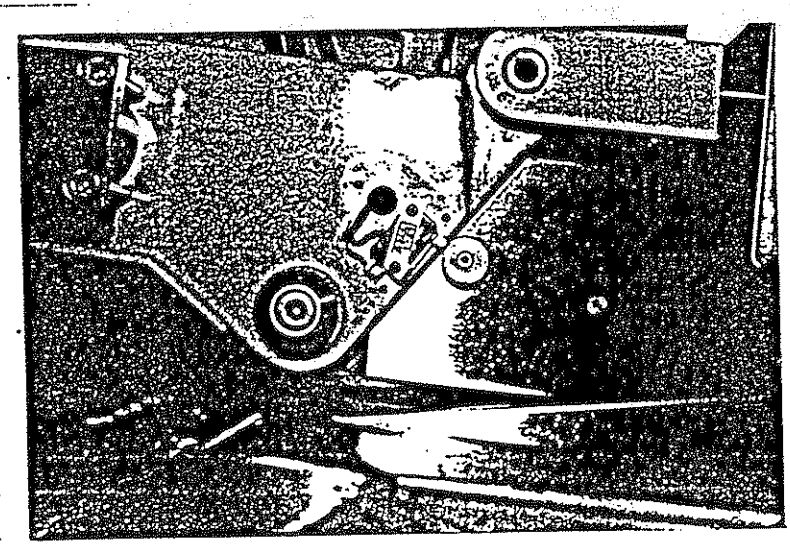
H. The role and adjustment of each switch

Refer Figs. 9 and 10 for the positions where these switches are fixed. Remove the stainless covers etc. for adjustment.

1. NO DOWN switch LS-6

This switch prevents the leg plates from striking the leg table unit when the table moves down while TRENDELENBURG is headup. This operation is affected by the angle of TRENDELENBURG, too.
As the table approaches the horizontal state, the length of the downward move also increases.
If the table is horizontal, the downward action continues to reach the lowest level.

To adjust, lower the UP-DOWN switch to the lowest level. Then activate the TRENDELENBURG OVERHEAD. When Face A and Face B on the Photo have become almost parallel, adjust to the LS-6 can function.

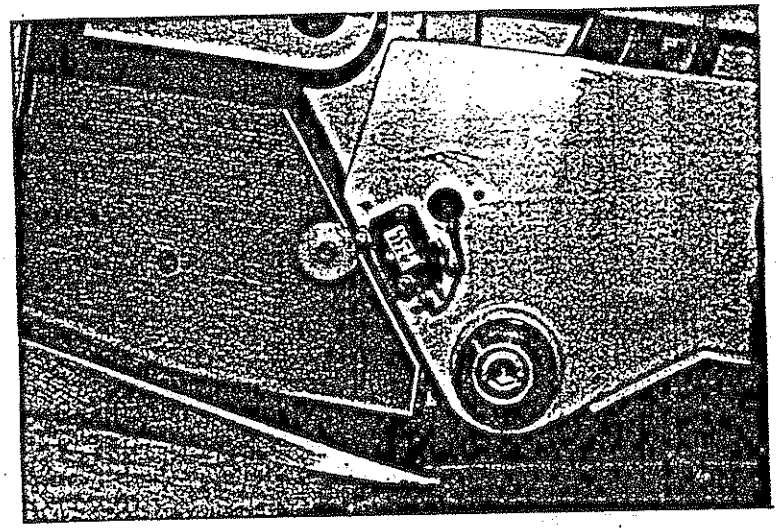


DRAWING-11. NO DOWN POSITION

2. NO HEAD UP switch (LS-5)

This switch is similar to LS-6. As TRENDELENBURG functions HEAD UP while the up-down section is descending, it will stop. The reason is, as in the case of LS-6, to prevent the leg plate from striking the leg table.

As in the case of LS-6, lower the UP-DOWN switch to the lowest level. Then activate TRENDELENBURG HEAD UP. When Face C and Face D in the Photo have become almost parallel, adjust so the LS-5 can function.



(PHOTO)

DRAWING-12 NO HEAD UP POSITION

3. TRENDELENBURG HORIZONTAL RETURN switch

HEAD UP HORIZONTAL switch : NS-1
HEAD DOWN HORIZONTAL switch: NS-2

The RETURN button on the operation returns the table from HEAD UP/DOWN tó HORIZONTAL.
As shown in Fig. 13, the switches are on the TRENDELENBURG cylinder inside.

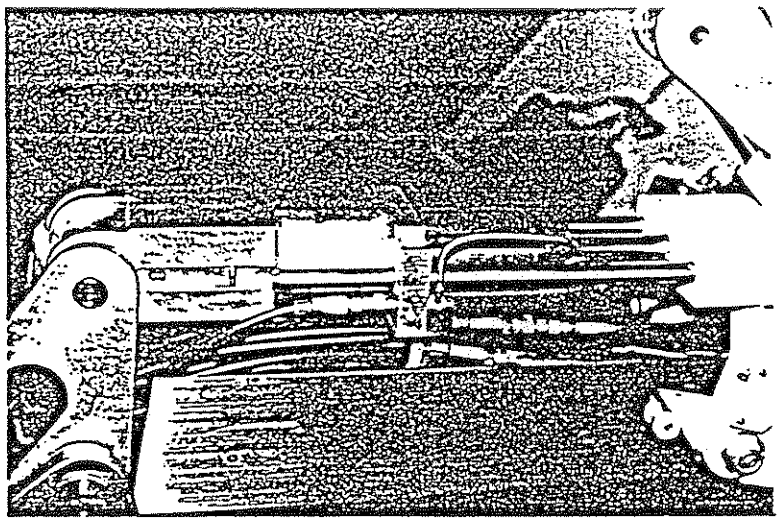
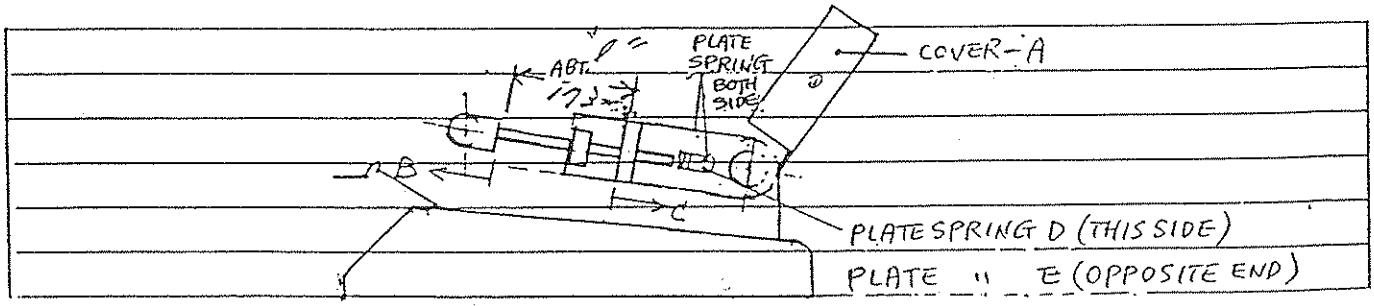


Fig. 13 TRENDELENBURG HORIZONTAL RETURN switch

(1) Adjustment method

a. Make the direction of TRENDELENBURG completely horizontal with a level. (Check by placing a level on the panel.)



DRAWING-13 ADJUSTMENT METHOD OF TREND. NS

b. How to remove the HORIZONTAL turn section cover
Lift the leg opening plate and lower the head section toward HEAD DOWN. Remove the 3 flathead screws on Cover A and set the cover upright as shown in Fig. 13.

c. According to the method in "a", measure the size of "l" in Fig. 13 when the panel section is made horizontal.

d. It is unnecessary to remove the arm of TRENDELENBURG except when microswitches NS-1 and 2 are checked.

e. Adjust by moving the cylinder of TRENDELENBURG .

f. Move the cylinder of TRENDELENBURG toward "B". Use the TRENDELENBURG and HEAD UP bottons.

g. Next, push the RETURN button. The cylinder will move toward "C". Then, NS-2 is pushed becoming horizontal and the cylinder stops. At this time, if it is equal to "l" measured in c., adjust by moving Sheet spring D by 0.7mm away, (e.g., if "l" is 173mm, it will be 173.7mm).

h. For HEAD UP HORIZONTAL switch NS-1, unlike of NS-2, move the cylinder toward C, and then push the RETURN switch.

i. The cylinder moves toward "B", and stops because NS-1 is no longer being pushed. At this time, NS-2 preserves the depressed state.

j. Measure the length of "l" when it stops. If "l" is 173mm when horizontal, adjust Sheet spring "E" (on the other side) so it will be 0.7mm closer (172.3mm).

4. Lat. Tilt, HORIZONTAL return switch

RIGHT UPTURN	HORIZONTAL	NS-10
LEFT UPTURN	HORIZONTAL	NS-9

Fig. 10 shows the positions of the switches and cam. Remove connecter fixing table (for NC-2, CN-15) A in Fig. 10.
At this time, if it is too tight to work inside, remove Nut "B", move the table fully away with the RETREAT button, and the connecter table can be removed below so adjustment of internal switches NS-9 and 10 will be easier.

(1) Adjustment methods

a. NS-10

Push the RETURN button when it is in Lateral Tilt RIGHT UP, the table will become horizontal. At this time, NS-10 is in the depressed state. Loosen the nut on the near side of the cam and move the adjusting cam.

Since the stroke is small when the microswitch is ON, make an allowance so that Button V-1A moves by approx. 0.3mm even in the depressed state. However, if given too much, malfunctioning will occur.

b. NS-9

Adjust in the same way as NS-10 in a. Since NS-9 switches from LEFT UP to HORIZONTAL, if RETURN switch is pushed while in the LEFT UP state, the table will be horizontal.

c. Neither NS-9 or 10 are pushed in the horizontal state.

d. To measure the levelness, use a level.
Adjust with some allowance for seesaw movements that may occur when returning.

5. Back plate limit switches

(1) Back lower limit switch (LS3)

This switch is located on the right side when looking from the head. Remove the rail on the panel section and the lid, and inside you will se two switches. The outer one is LS3. Whenever the back plate falls to 30°, the switch pushing lever comes into the backplate arm groove, pushes Microswitch (LS3), and stops.

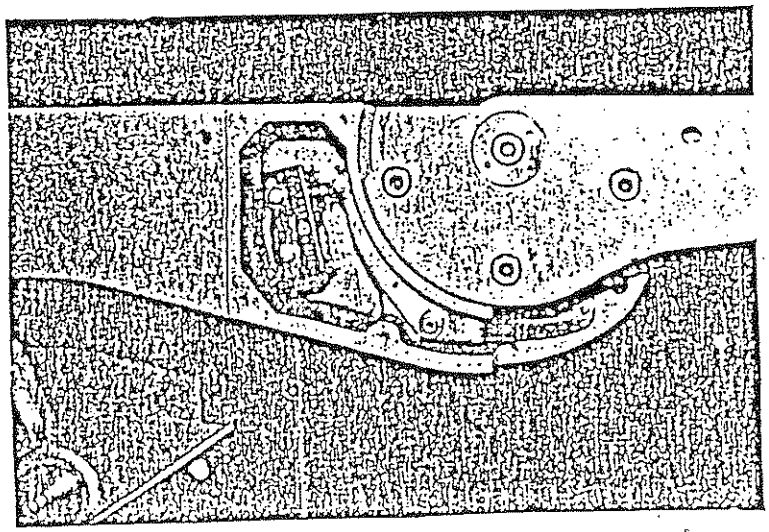
(Caution) Whenever this switch is pushed and the backplate does not stop even at 30°, the backplate arm will severely damage the bakelite of the waist plate.

Adjust carefully so loose sections will not cause malfunctions.

(2) Backplate upper limit switch (LS4)

This switch locates on the left side as seen from the head. It is on the opposte side of LS3. It is also the outside one of two. Whenever the backplate becomes right angle to the waist plate, the tip of lever comes into the backplate arm groove to push the microswitch, and the backplate stops.

(Caution) Similarly to the case of BACK DOWN, if 90° is exceeded, this action would also cause damages of sections. Adjust with full care.



6. Backplate horizontal return switch

BACK UP	HORIZONTAL	NS5
BACK DOWN	HORIZONTAL	NS6

NS5 and NS6 are switches located inside LS3 and LS4 respectively.

(1) Adjustment method

a. Increase the backplate angle higher than horizontal. (BACK UP state)

b. Push the RETURN button, and the back plate will become horizontal. At this time, the switch is pushed by the plunger pushed by the backplate arm. In this state, the backplate stops, and becomes horizontal.

c. Place a level on the backplate to compare its levelness with that of waist plate. For NS5, adjustment is made so that the switch is pushed when in a slight BACK UP state rather than horizontal.

d. Adjust by loosening the fastening screw of NS5 and moving the switch back and forth.

(2) NS6 adjustment method

a. Decrease the back plate angle below horizontal. (BACK DOWN state)

b. Push the RETURN button to make the backplate horizontal. At this time, the switch is no longer depressed and the backplate stops.

c. For NS6, when the switch is no longer depressed, the backplate is horizontal.

d. Adustiment is made by loosening the screw as for NS5.

e. Whenever horizontality is surpassed and the backplate seasaws, readjust by moving NS5 a bit forward or moving NS6 a bit back.

7. Horizontal slide, Return to center

NS-3 LEFT CENTER

NS-4 RIGHT CENTER

The positions of these microswitches are shown in Fig. 10.
First, remove Waist plate C. Then, remove the cover of D. For later procedures, see Fig. 10.

Adjustment method

a. For NS-3

Push the RETURN button in the TOWARD LEFT state to return to the CENTER. At this time, NS-3 is no longer depressed, and sliding stops.
Adjustment of the action point (center) is made by moving the upper and lower dock sheets to the right and left.

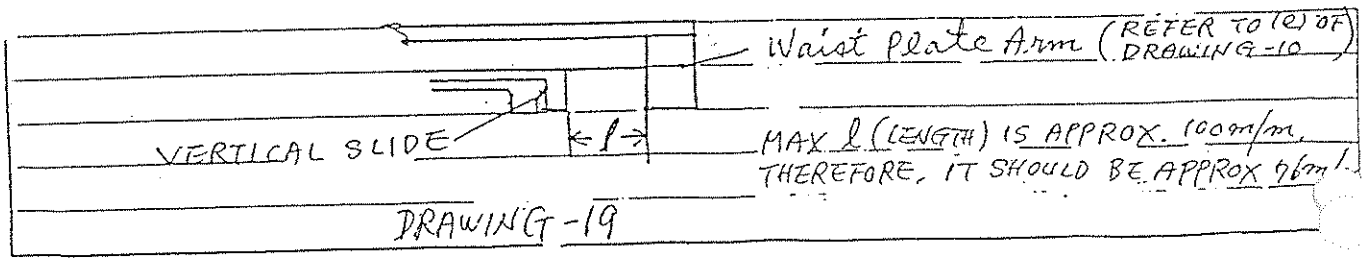
b. For NS-4

Push the RETURN button in the TOWARD RIGHT state to return to the CENTER. At this time, as in the case of NS-3, NS-4 is no longer depressed, and sliding stops.
Adjustment of the action point (center) is made by moving the dock which was not used for NS-3 to the right and left.

c. To have the action points of NS-3 and NS-4 move in parallel, make simultaneous right and left movements of the two upper and lower dock sheets.

d. Since there is little stroke when V-1A is ON, make an allowance of approx 0.3mm even when depressed.
However, if separated too much, action will be unstable.

e. To confirm the position of the center, measure the maximum quantity of horizontal movement (ℓ in Fig. 19), and confirm that the position of the center is 1 - 2mm this side of the midpoint of 1.



DRAWING-19

8. Vertical slide, Return to center

NS-7 FORWARD CENTER

NS-8 BACKWARD CENTER

The positions of these microswitches are shown in Fig. 10. First, remove Waist plate C, then remove the cover of D.
For later procedures, see Fig. 10.

Adjustment method

a. For NS-7

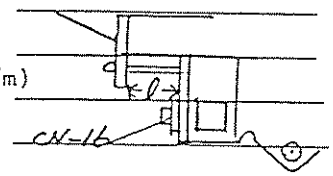
Push the RETURN button in the FORWARD state to (toward legs), return to CENTER. At this time, NS-7 is no longer pushed from below by a pin, and it stops.
Adjustment of the action point (center) is made by loosening the microswitch and making up and down movement.

b. For NS-8

Pushed by a pin toward the center from the BACKWARD state (toward head), sliding stops.
Adjustment of the action pint (center) is made by loosening the microswitch and making up and down movement as for NS-7.

c. To confirm the position of the center, measure the maximum quantity of verical movement (1 in Fig. 20), and confirm that the position of the center is 1 - 2mm this side of the midpoint of 1.

Max. L = about 100m/m.
So,it should be approx (50m/m)



DRAWING-20

9. A common problems with horizontal returns

If the action point of the microswitch pair (e.g., NS-1, and NS-2) draws too close, they will be in a seesaw state so make them act a bit off of horizontality or center as stated in "adjustment method".

I. CHECK LIST FOR FREQUENT PROBLEMS

(1) Power

Cases where there is no irrqularity in the measurements on and between connecters but there is no output or voltage:

a. The hydraulic motor does not function.

a-1 No function at both high and low speeds.
Check RS-a in Fig. 4.

a-2 No function at high speed only
Check RS-1, RL-16 (relay) on the motor driving base,
R2: 300 Ω, R3: 510 Ω, R4: 10 Ω and
the TRIAC for high speed Th-1.
(3) Tester lead (+)
between 3 - 5 34 Ω
between 3 - 4 ∞

a-3 No function at low speed only
Check RS-a and RL-17 (relays) on the motor driving base,
R6: 300 Ω, R7: 1 Ω, R8: 10 Ω and
the TRIAC for low speed Th-2.
(3) Tester lead (+)
between 3 - 1 34 Ω
between 3 - 2 ∞

b. All solenoid valves do not function.
Check RS-2.

c. Control voltage DC 25V does not come out.
See Fig. 7.
(1) Does AC 25V reach 28 and 29?
Do (10) ← (+), (11) ← GND output DC 24 - 25?

MOVE does not function

(1) Operation switch between CN-2' 10 - 13 — See Fig. 12

(2) Control base D9 diode — See Fig. 7

(3) RL-14 — See Fig. 8

(4) MOVE valve — See Fig. 2

f. SPEED CHANGE does not function

Won't switch to HIGH SPEED

(1) Operation switch between CN-2' 10 - 15 — See Fig. 12

(2) Is RL-2 functioning? Is holding of RL-1 cuttable? D23 diode: RL-5 — See Fig. 7

(3) Check Item a-2 for Power Unit check — See Fig. 8

Won't switch to LOW SPEED

(1) Operation switch between CN-2' 10 - 14 — See Fig. 5

(2) Is RL-1 functioning? (control base) — See Fig. 7

(3) Check Item 1-3 for Power Unit check

g. HORIZONTAL SLIDE

RIGHT MOVE does not function

(1) Operation switch between CN-2' 10 - 4 — See Fig. 5

(2) Control base D5, diode — See Fig. 7

(3) RL-10 — See Fig. 8

(4) LIGHT MOVE valve — See Fig. 2

LEFT MOVE does not function

(1) Operation switch between CN-2' 10 - 3 — See Fig. 5

(2) Control base D6, diode — See Fig. 7

(3) RL-11 — See Fig. 8

(4) LEFT MOVE valve — See Fig. 2

h. VERTICAL SLIDE

FORWARD does not function toward legs

(1) Operation switch between CN-2' 10 - 16	See Fig. 5
(2) Control base D32, diode	See Fig. 7
(3) RL-19	See Fig. 8
(4) FORWARD valve	See Fig. 2

BACKWARD does not function toward head

(1) Operation switch between CN-2' 10 - 17	See Fig. 5
(2) Control base D31, diode	See Fig. 7
(3) RL-18	See Fig. 8
(4) BACKWARD valve	See Fig. 2

i. RETURN

(1) Operation switch between CN-2' 10 - 9 TRENDELENBURG, BACKPLATE, VERTICAL TURN
between CN-2' 10 - 20 VERTICAL/HORIZONTAL SLIDE

(2) Check each microswitch for HORIZONTAL RETURN

(3) TRENDELENBURG

HEAD UP HORIZONTAL does not function.

a. Is NS-2 depressed?	See "3", P-24
b. Is NS-1 depressed?	See "3", P-24
c. Control base D11, D17 diode	See Fig. 7

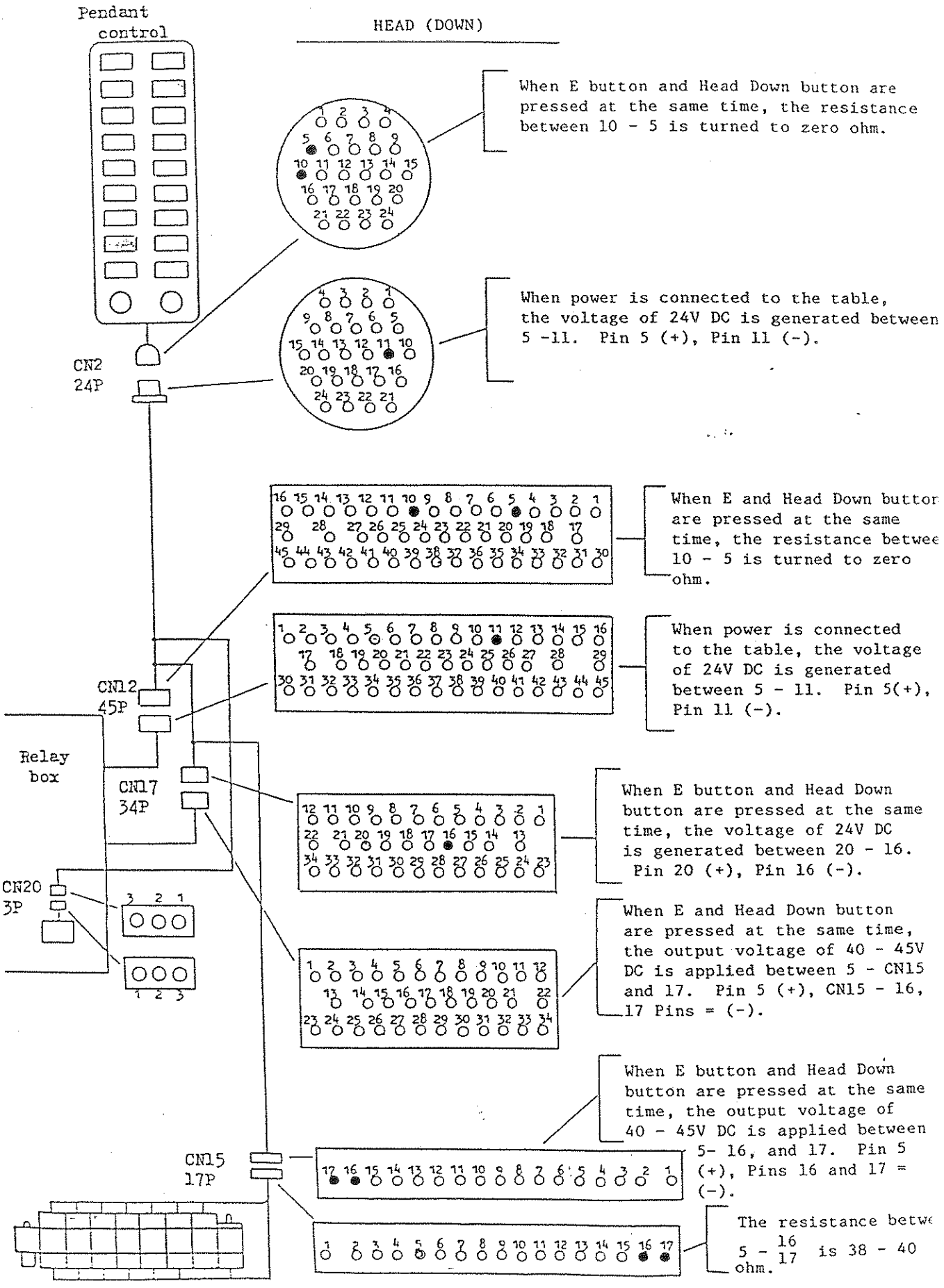
HEAD UP HORIZONTAL does not function.

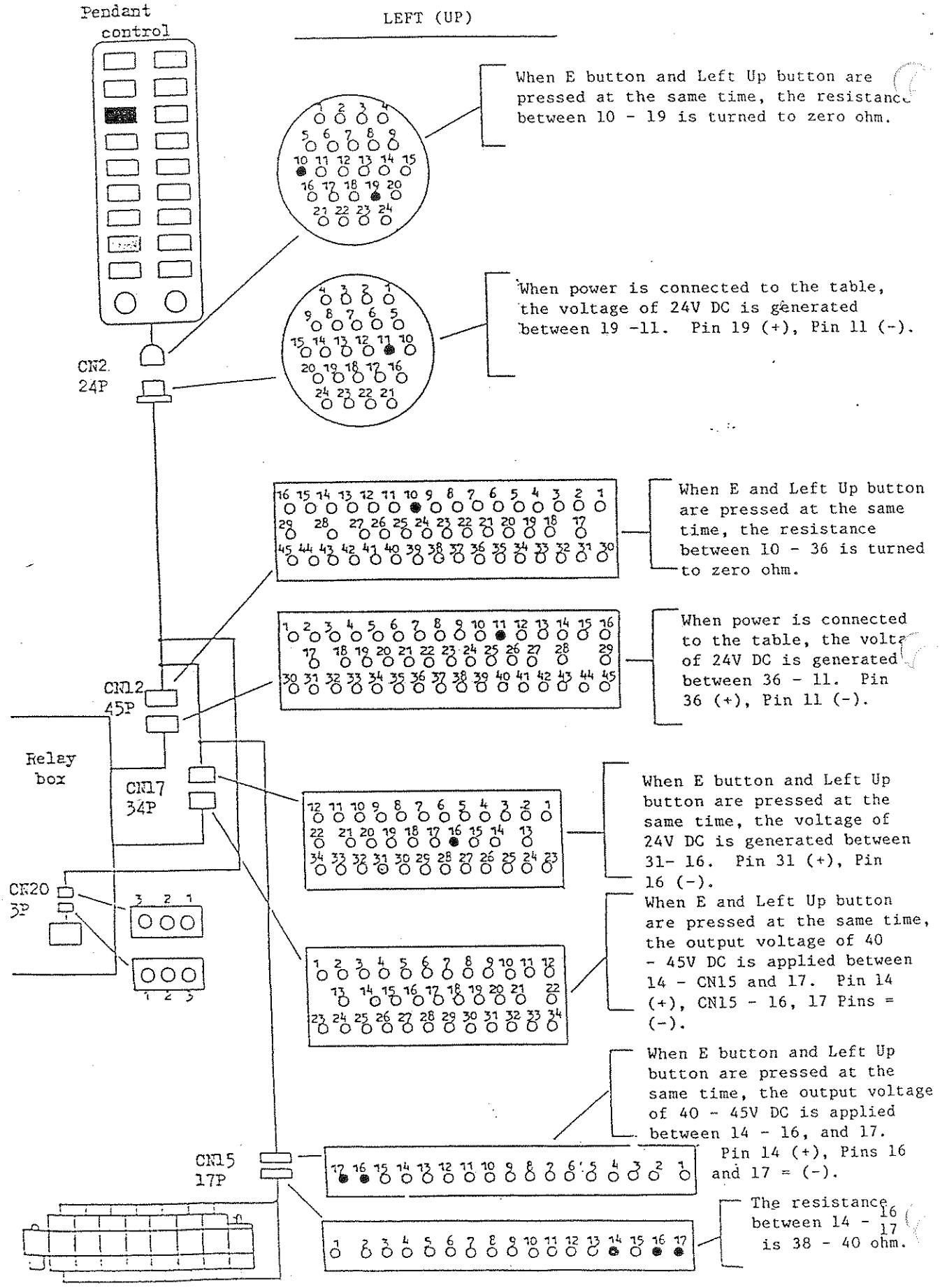
a. Is NS-2 depressed?	See "3"
b. Control base D12, D18 diode	See Fig. 7

(4) LATERAL TILT

LEFT DOWN HORIZONTAL does not function.

a. Is NS-9 depressed?	See "4", P-26
b. Control base D35, D37 diode	See Fig. 7


Pendant control
HEAD (DOWN)
When E button and Head Down button are pressed at the same time, the resistance between 10 - 5 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 5 -11. Pin 5 (+), Pin 11 (-).
CN2 24P
When E and Head Down buttor are pressed at the same time, the resistance betwee 10 - 5 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 5 - 11. Pin 5(+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Head Down button are pressed at the same time, the voltage of 24V DC is generated between 20 - 16. Pin 20 (+), Pin 16 (-).
CN20 3P
When E and Head Down button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 5 - CN15 and 17. Pin 5 (+), CN15 - 16, 17 Pins = (-).
When E button and Head Down button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 5- 16, and 17. Pin 5 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance betwe 5 - 16 17 is 38 - 40 ohm.


Pendant control
LEFT (UP)
When E button and Left Up button are pressed at the same time, the resistance between 10 - 19 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 19 -11. Pin 19 (+), Pin 11 (-).
CN2 24P
When E and Left Up button are pressed at the same time, the resistance between 10 - 36 is turned to zero ohm.
When power is connected to the table, the volta of 24V DC is generated between 36 - 11. Pin 36 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Left Up button are pressed at the same time, the voltage of 24V DC is generated between 31- 16. Pin 31 (+), Pin 16 (-).
CN20 3P
When E and Left Up button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 14 - CN15 and 17. Pin 14 (+), CN15 - 16, 17 Pins = (-).
When E button and Left Up button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 14 - 16, and 17. Pin 14 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 14 - 16 - 17 is 38 - 40 ohm.

(2) Cases where there is an irregularity in a section:
Check the following.

a. UP/DOWN

Does not go up.

(1) Operation switch between CN-2' 10 - 7	See Fig. 5
(2) Control unit base D2 diode	See Fig. 7
(3) RL-7	See Fig. 8
(4) UP valve	See Fig. 2

Does not go down.

(1) Operation switch between CN-2' 10 - 8	See Fig. 5
(2) NO DOWN switch, if LS-5 is pushed	See Fig. 10
(3) Control base D1 diode	See Fig. 7
(4) RL-6	See Fig. 8
(5) DOWN valve	See Fig. 2

b. TRENDELENBURG

HEAD UP does not function.

(1) Operation switch between CN-2' 10 - 6	See Fig. 5
(2) NO HEAD UP switch, if LS-5 is pushed	See Fig. 9
(3) Control base D4 diode	See Fig. 7
(4) RL-9	See Fig. 8
(5) HEAD UP valve	See Fig. 2

HEAD DOWN does not function.

(1) Operation switch between CN-2' 10 - 5	See Fig. 5
(2) Control base D3 diode	See Fig. 7
(3) RL-8	See Fig. 8
(4) HEAD DOWN VALVE	See Fig. 2

c. LATERAL TILT

RIGHT UP does not function

(1) Operation switch between CN-2' 10 - 18	See Fig. 5
(2) Control base D33, diode	See Fig. 7
(3) RL-20	See Fig. 8
(4) RIGHT UP valve	See Fig. 2

LEFT UP does not function

(1) Operation switch between CN-2' 10 - 19	See Fig. 5
(2) Control base D34, diode	See Fig. 7
(3) RL-21	See Fig. 8
(4) LEFT UP valve	See Fig. 2

d. Backplate

BACK UP does not function

(1) Operation switch between CN-2' 10 - 1	See Fig. 5
(2) If LS-4 BACK UP LIMIT switch is pushed	See Fig. 9
(3) Control base D8, diode	See Fig. 7
(4) RL-13	See Fig. 8
(5) BACK UP valve	See Fig. 2

BACK DOWN does not function

(1) Operation switch between CN-2' 10 - 2	See Fig. 5
(2) If LS-3 BACK DOWN LIMIT switch is pushed	See Fig. 9
(3) Control base D7, diode	See Fig. 7
(4) RL-12	See Fig. 8
(5) BACK DOWN valve	See Fig. 2

e. Brake

FIX does not function.

(1) Operation switch between CN-2' 10 - 12	See Fig. 12
(2) Control base D10 diode	See Fig. 7
(3) RL-16	See Fig. 6
(4) Fix valve	See Fig. 6

RIGHT DOWN HORIZONTAL does not function.

a. Is NS-10 depressed? See "4", P-26

b. Control base D36, D38 diode See Fig. 7

(5) Backplate

BACKDOWN HORIZONTAL does not function

a. Is NS-6 depressed? See "6", P-28

b. Control base D16, D22 diode See Fig. 7

BACK UP HORIZONTAL does not function.

a. Is NS-6 depressed? See "6", P-28

b. Is NS-5 no longer depressed? See "6", P-28

c. Control base D15, D21 diode See Fig. 7

(6) Horizontal Slide

LEFT CENTER does not function.

a. Is NS-3 depressed? See "7", P-29

b. Control base D13, D19 diode See Fig. 7

RIGHT CENTER does not function.

a. Is NS-4 depressed? See "7", P-29

b. Control base D14, D29 diode See Fig. 7

(7) Vertical Slide

FRONT CENTER does not function.

a. Is NS-7 depressed? See "8", P-30

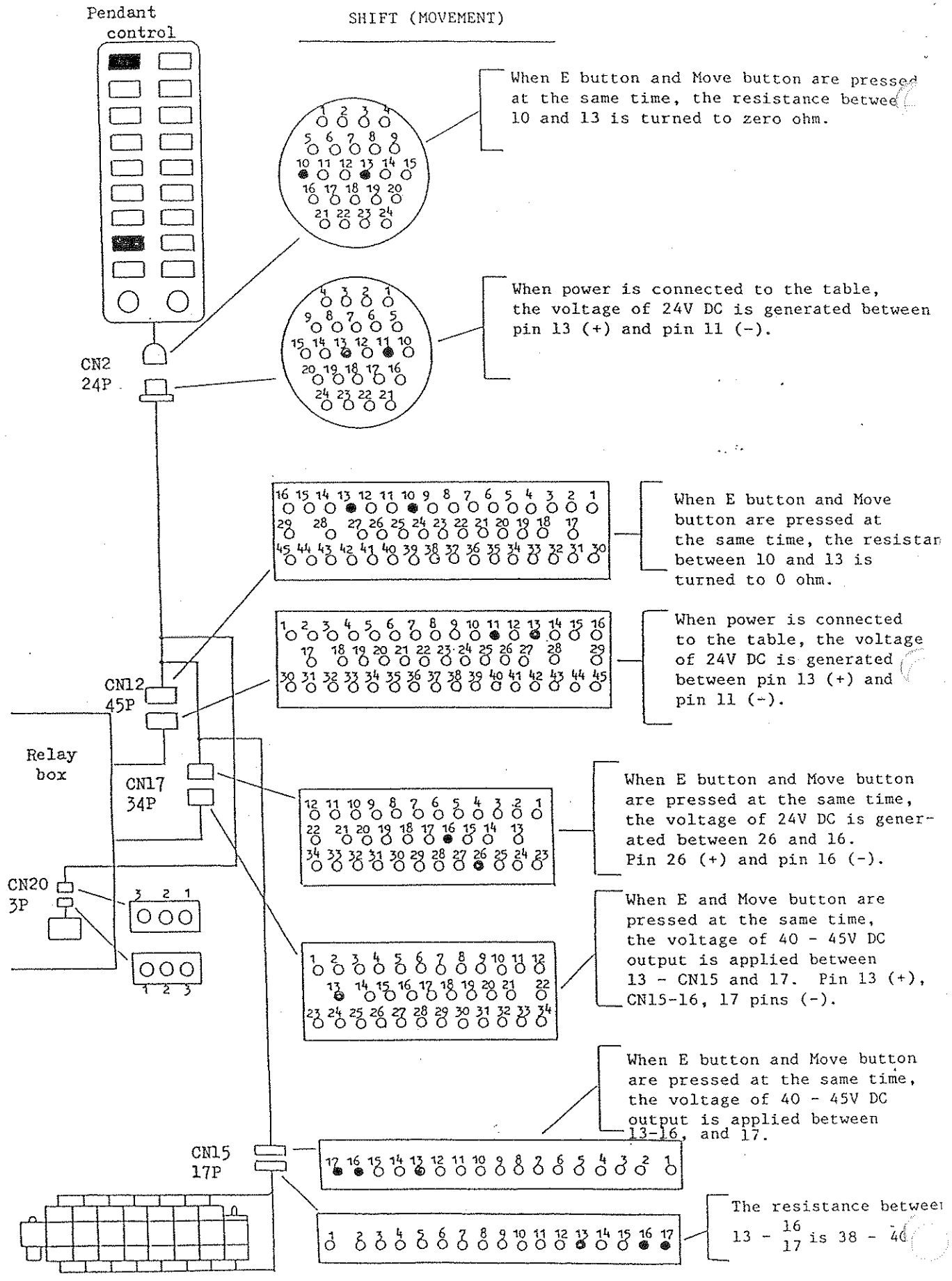
b. Control base D27, D29 diode See Fig. 7

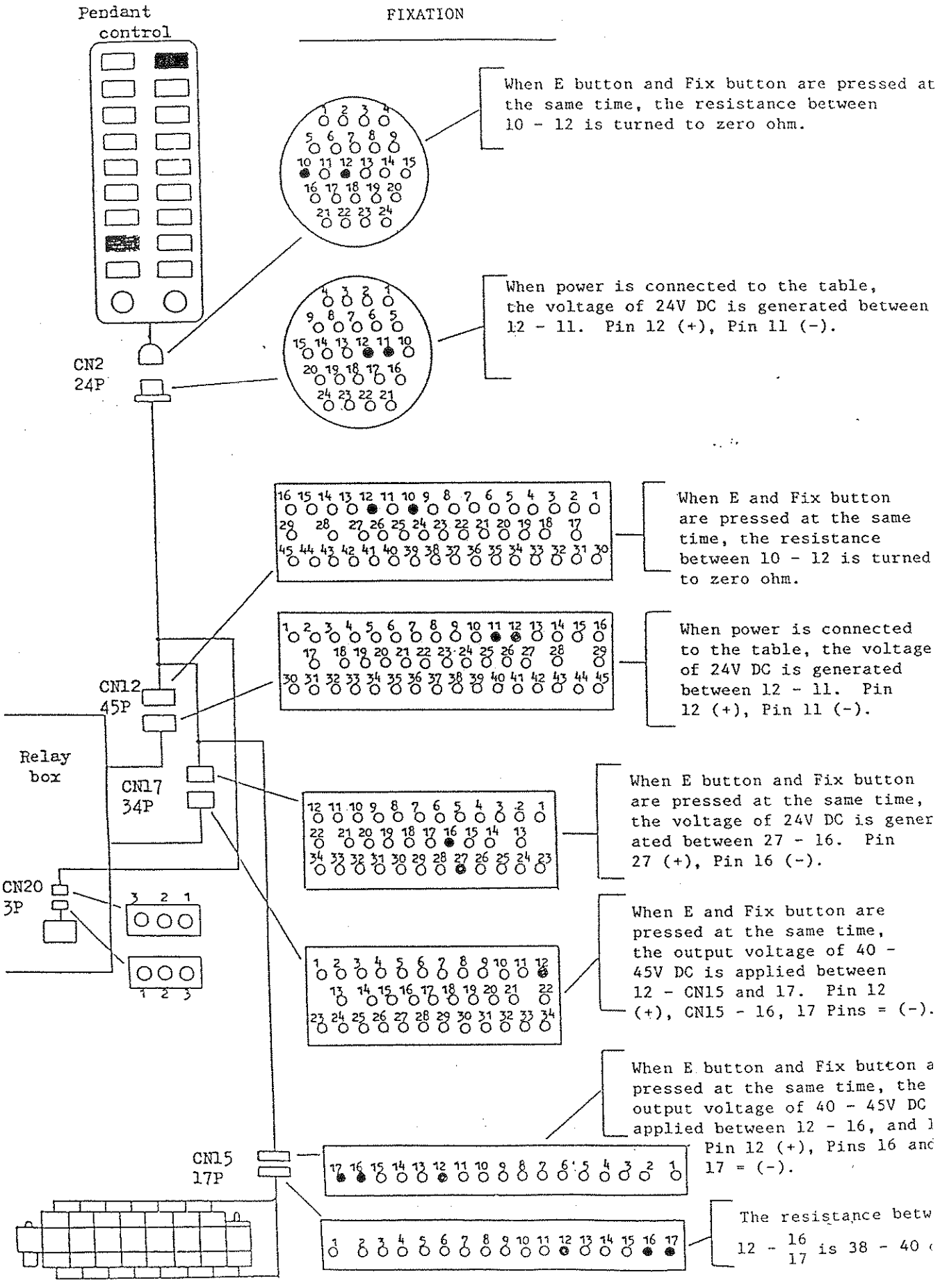
REAE CENTER does not function

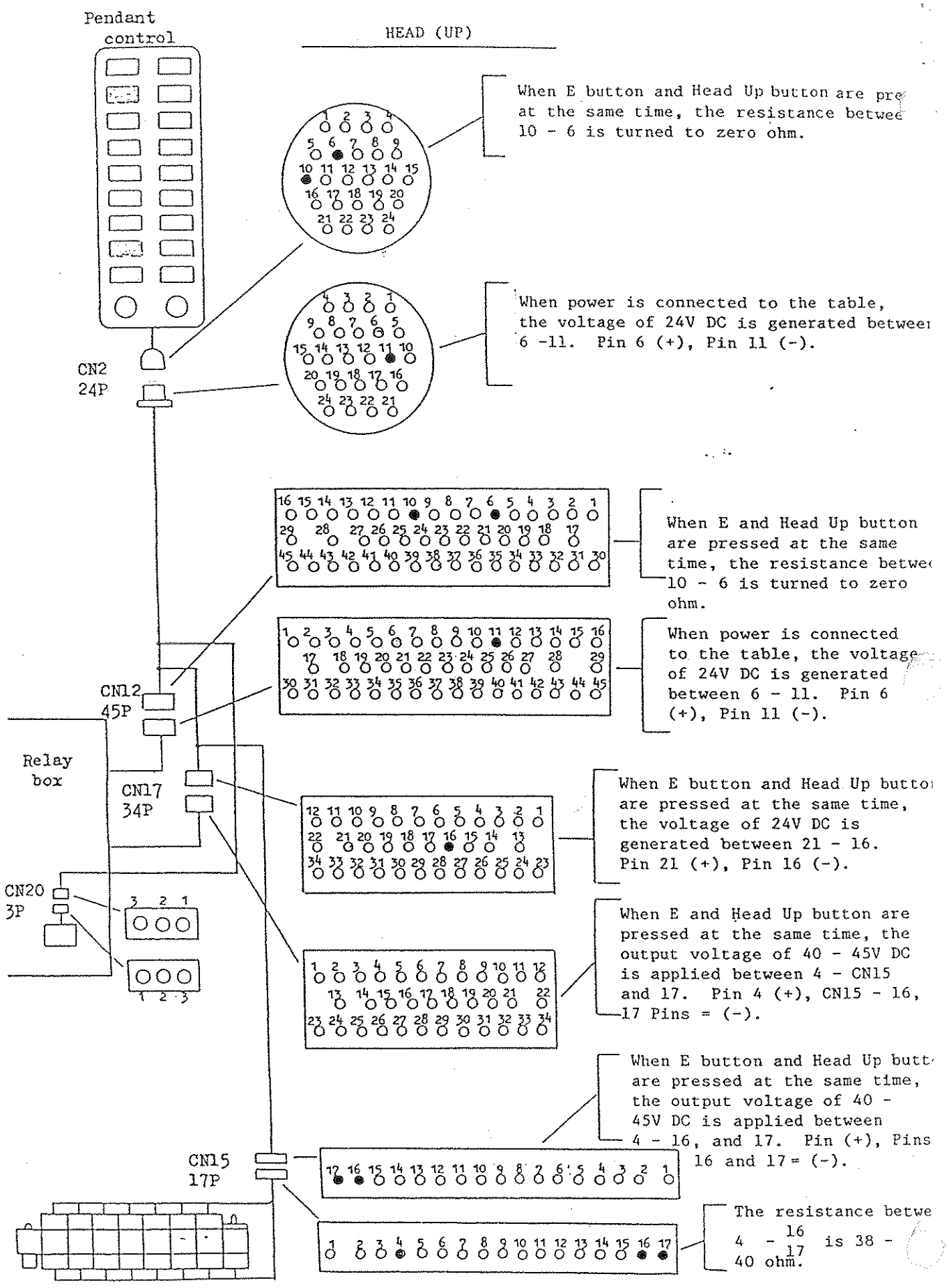
a. Is NS-8 in an undepressed state? See "8", P-30

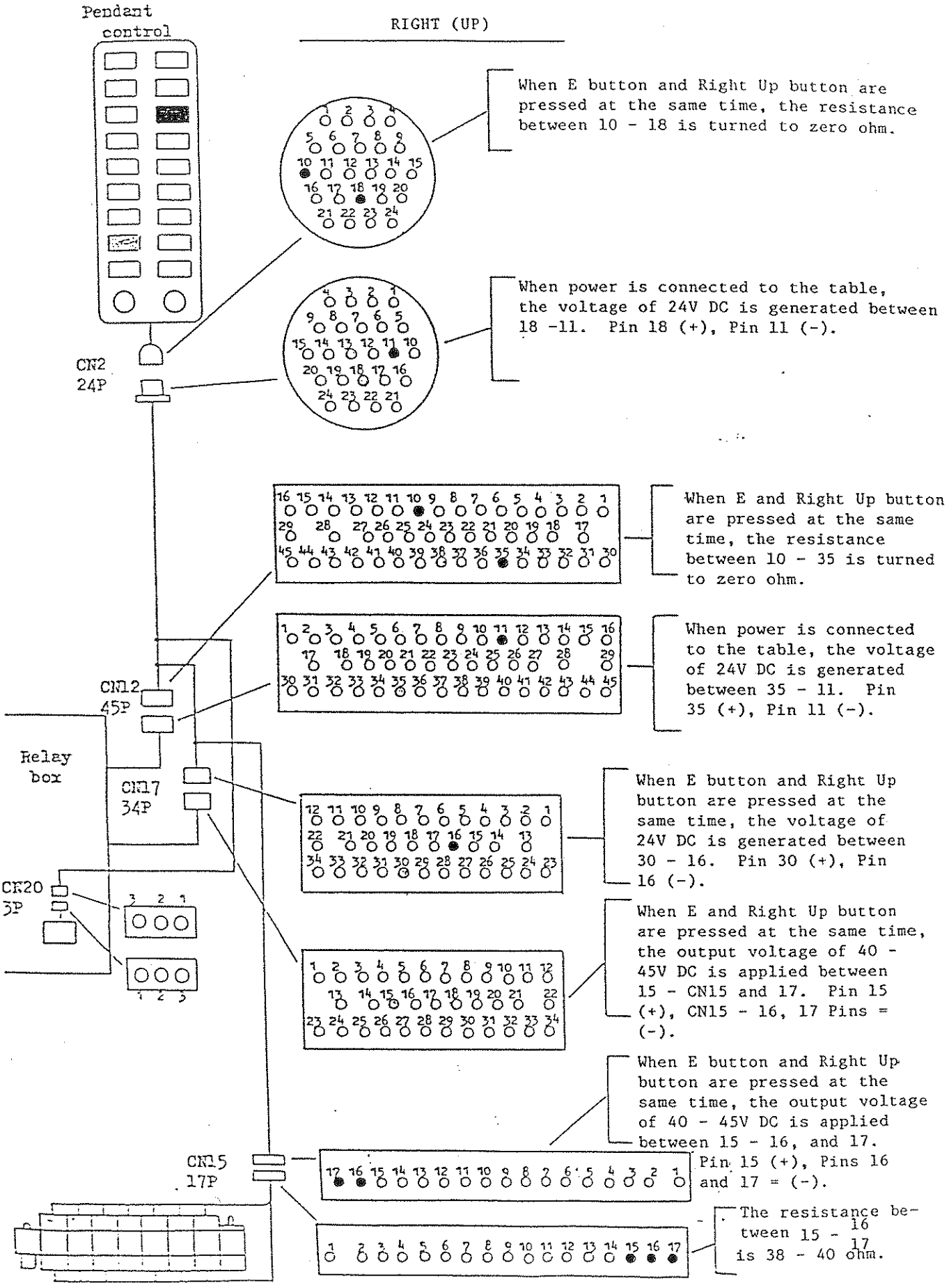
b. Is NS-7 also in an undepressed state?

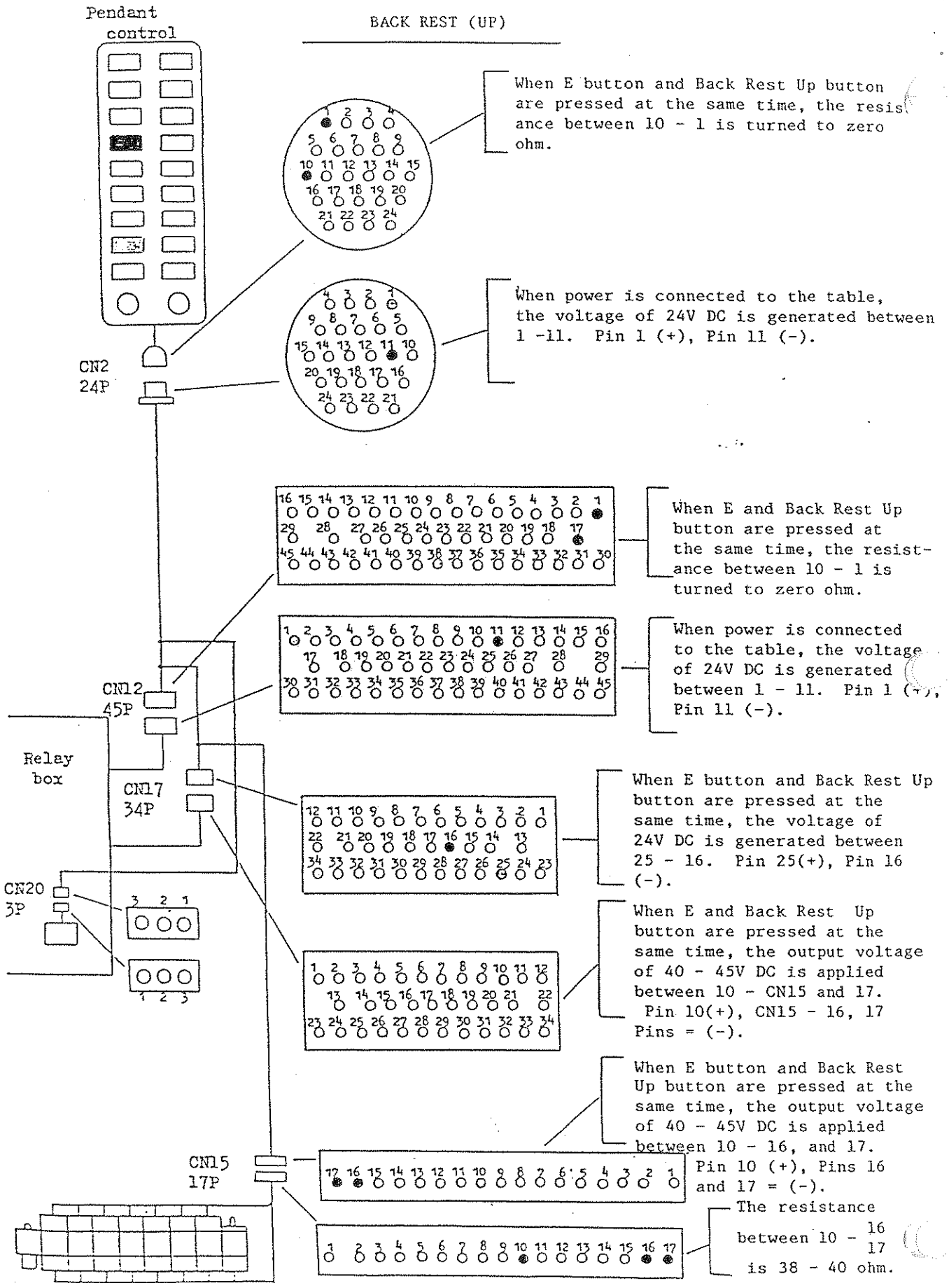
c. Control base D28, D30 diode See Fig. 7


Pendant control
SHIFT (MOVEMENT)
When E button and Move button are pressed at the same time, the resistance betwee 10 and 13 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between pin 13 (+) and pin 11 (-).
CN2
24P
When E button and Move button are pressed at the same time, the resistan between 10 and 13 is turned to 0 ohm.
When power is connected to the table, the voltage of 24V DC is generated between pin 13 (+) and pin 11 (-).
CN12
45P
Relay box
CN17
34P
When E button and Move button are pressed at the same time, the voltage of 24V DC is generated between 26 and 16. Pin 26 (+) and pin 16 (-).
CN20
3P
When E and Move button are pressed at the same time, the voltage of 40 - 45V DC output is applied between 13 - CN15 and 17. Pin 13 (+), CN15-16, 17 pins (-).
When E button and Move button are pressed at the same time, the voltage of 40 - 45V DC output is applied between 13-16, and 17.
CN15
17P
The resistance betwee
13 - 16/17 is 38 - 4

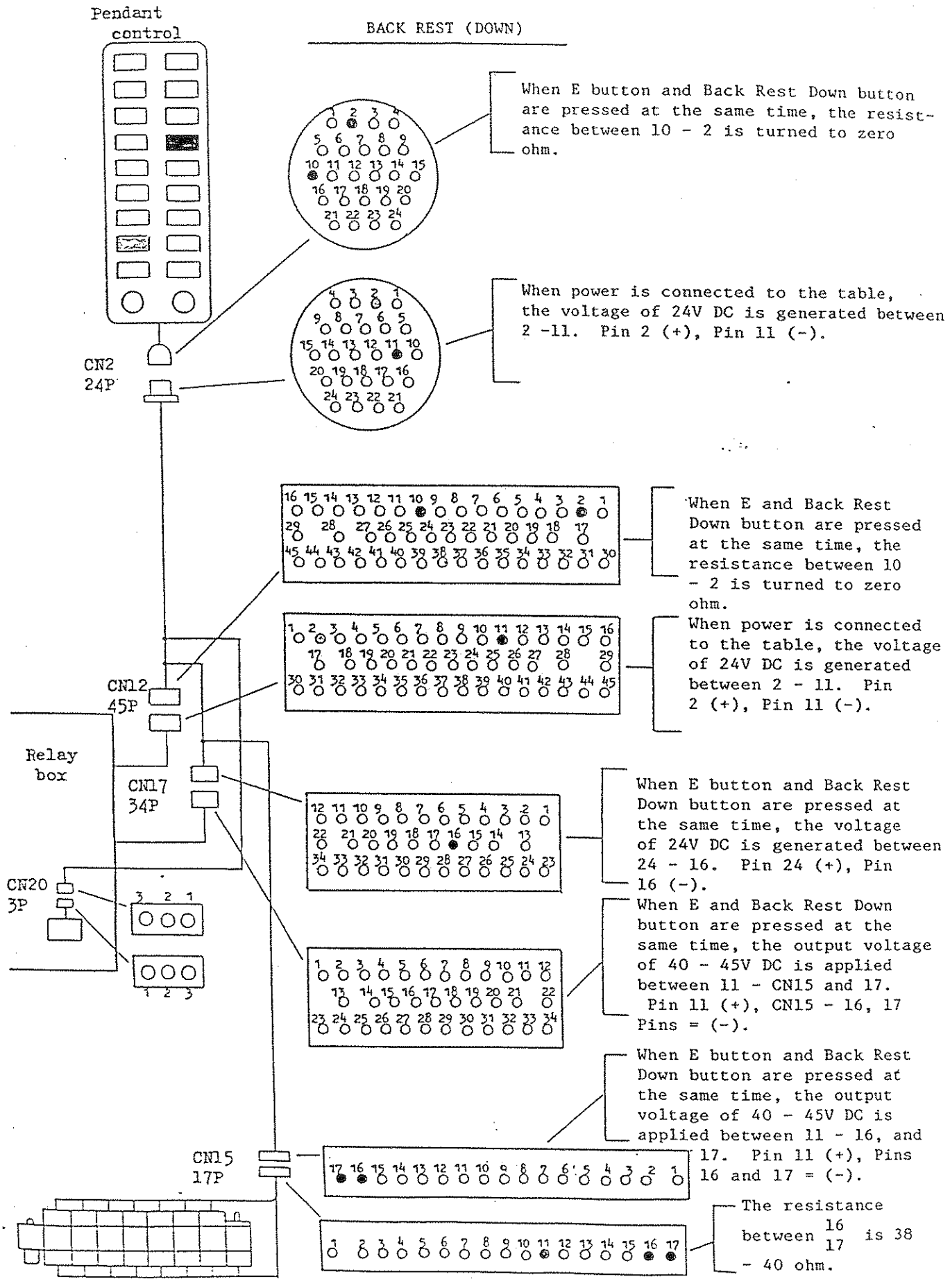

Pendant control
FIXATION
When E button and Fix button are pressed at the same time, the resistance between 10 - 12 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 12 - 11. Pin 12 (+), Pin 11 (-).
CN2 24P
When E and Fix button are pressed at the same time, the resistance between 10 - 12 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 12 - 11. Pin 12 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Fix button are pressed at the same time, the voltage of 24V DC is generated between 27 - 16. Pin 27 (+), Pin 16 (-).
CN20 3P
When E and Fix button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 12 - CN15 and 17. Pin 12 (+), CN15 - 16, 17 Pins = (-).
When E button and Fix button a pressed at the same time, the output voltage of 40 - 45V DC applied between 12 - 16, and 1 Pin 12 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance betw 12 - 16 17 is 38 - 40


Pendant control
HEAD (UP)
When E button and Head Up button are pre at the same time, the resistance betwee 10 - 6 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated betwee 6 -11. Pin 6 (+), Pin 11 (-).
CN2 24P
When E and Head Up button are pressed at the same time, the resistance betwe 10 - 6 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 6 - 11. Pin 6 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Head Up butto are pressed at the same time, the voltage of 24V DC is generated between 21 - 16. Pin 21 (+), Pin 16 (-).
CN20 3P
When E and Head Up button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 4 - CN15 and 17. Pin 4 (+), CN15 - 16, 17 Pins = (-).
When E button and Head Up butt are pressed at the same time, the output voltage of 40 - 45V DC is applied between 4 - 16, and 17. Pin (+), Pins 16 and 17 = (-).
CN15 17P
The resistance betwe 4 - 16 17 is 38 - 40 ohm.

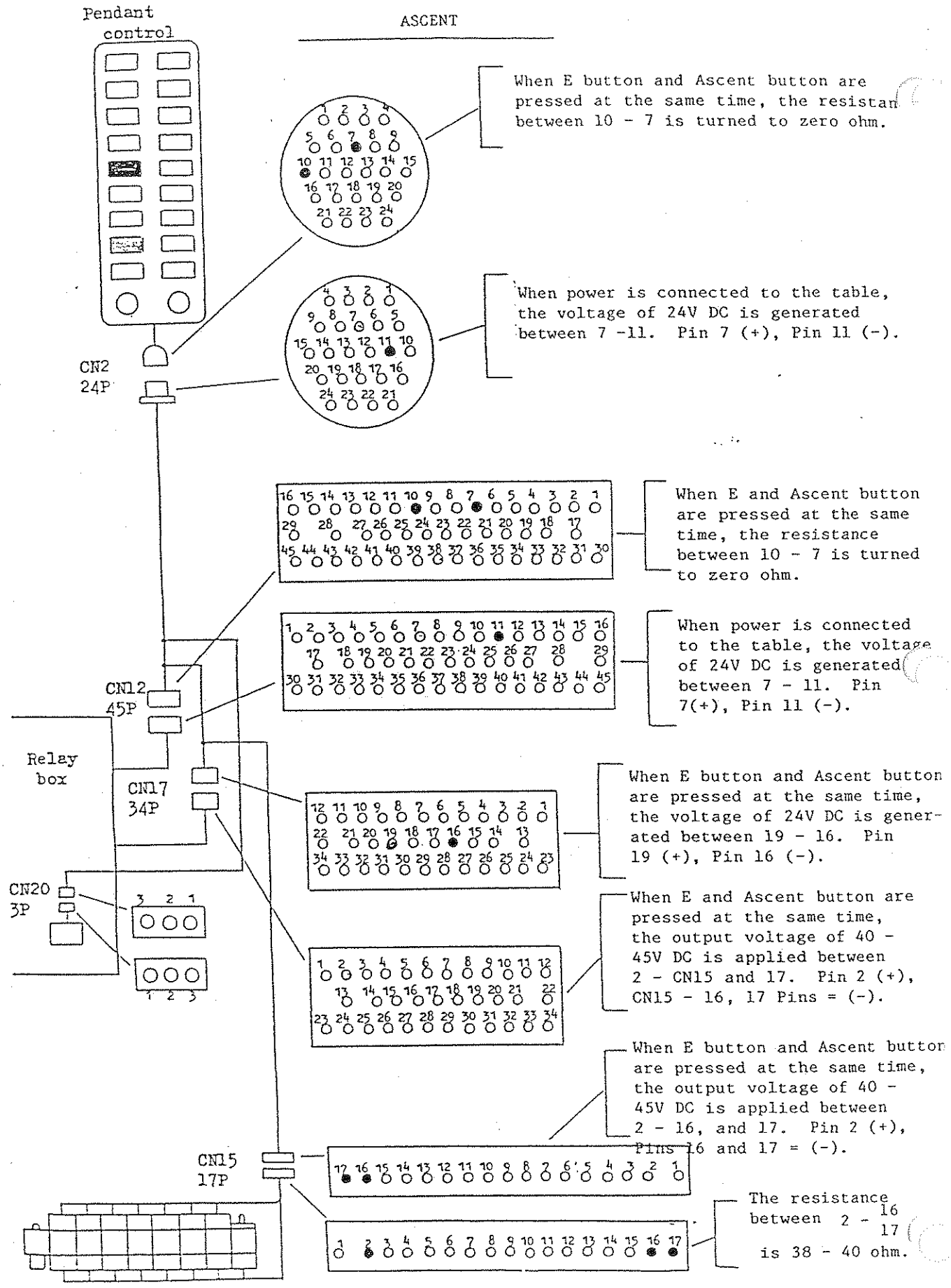

Pendant control
RIGHT (UP)
When E button and Right Up button are pressed at the same time, the resistance between 10 - 18 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 18 -11. Pin 18 (+), Pin 11 (-).
CN2 24P
When E and Right Up button are pressed at the same time, the resistance between 10 - 35 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 35 - 11. Pin 35 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Right Up button are pressed at the same time, the voltage of 24V DC is generated between 30 - 16. Pin 30 (+), Pin 16 (-).
CN20 3P
When E and Right Up button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 15 - CN15 and 17. Pin 15 (+), CN15 - 16, 17 Pins = (-).
When E button and Right Up button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 15 - 16, and 17. Pin 15 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 15 - 16 17 is 38 - 40 ohm.

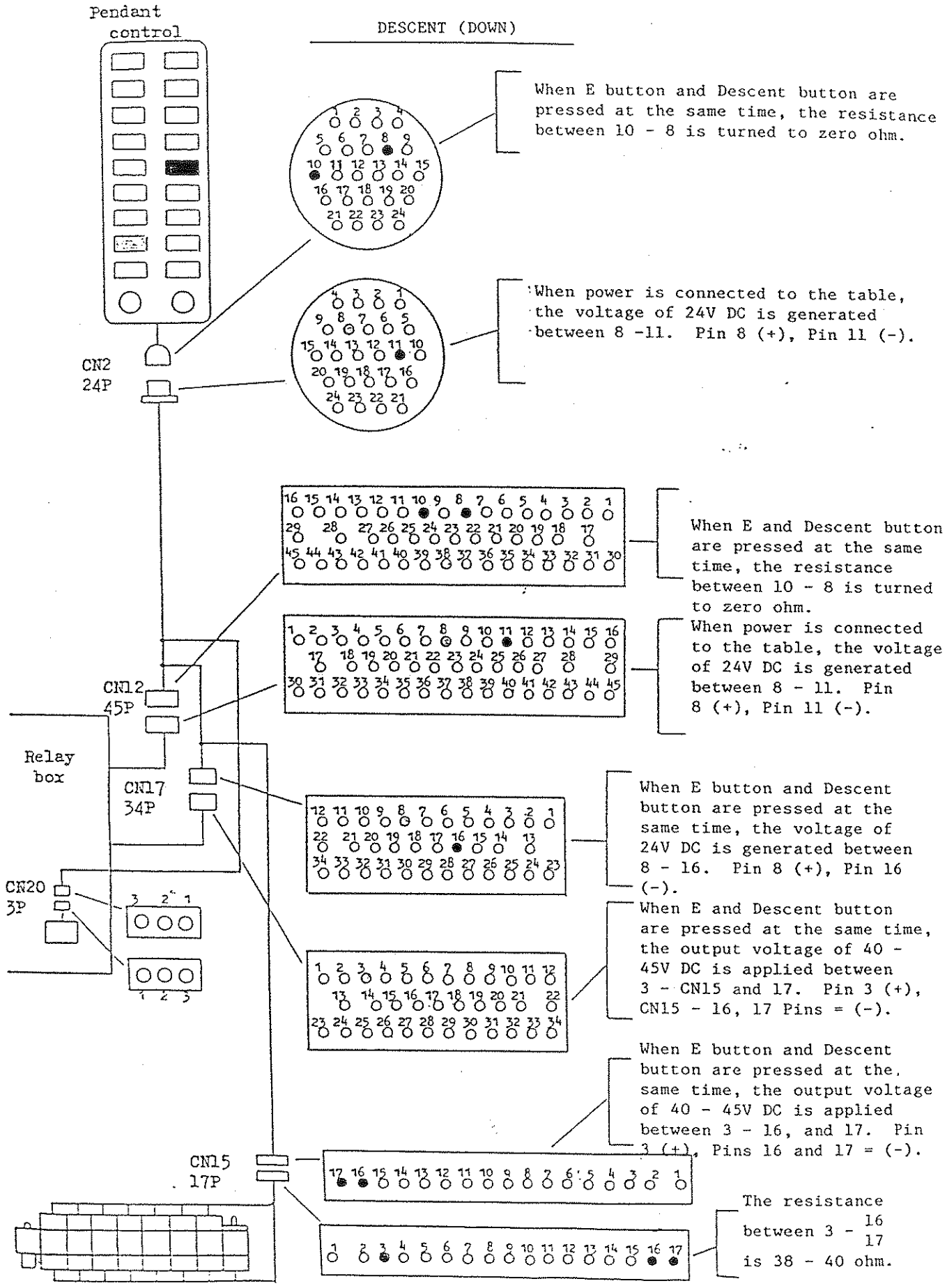

Pendant control
BACK REST (UP)
When E button and Back Rest Up button are pressed at the same time, the resistance between 10 - 1 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 1 -11. Pin 1 (+), Pin 11 (-).
CN2 24P
When E and Back Rest Up button are pressed at the same time, the resistance between 10 - 1 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 1 - 11. Pin 1 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Back Rest Up button are pressed at the same time, the voltage of 24V DC is generated between 25 - 16. Pin 25(+), Pin 16 (-).
CN20 3P
When E and Back Rest Up button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 10 - CN15 and 17. Pin 10(+), CN15 - 16, 17 Pins = (-).
When E button and Back Rest Up button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 10 - 16, and 17. Pin 10 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 10 - 16 17 is 38 - 40 ohm.

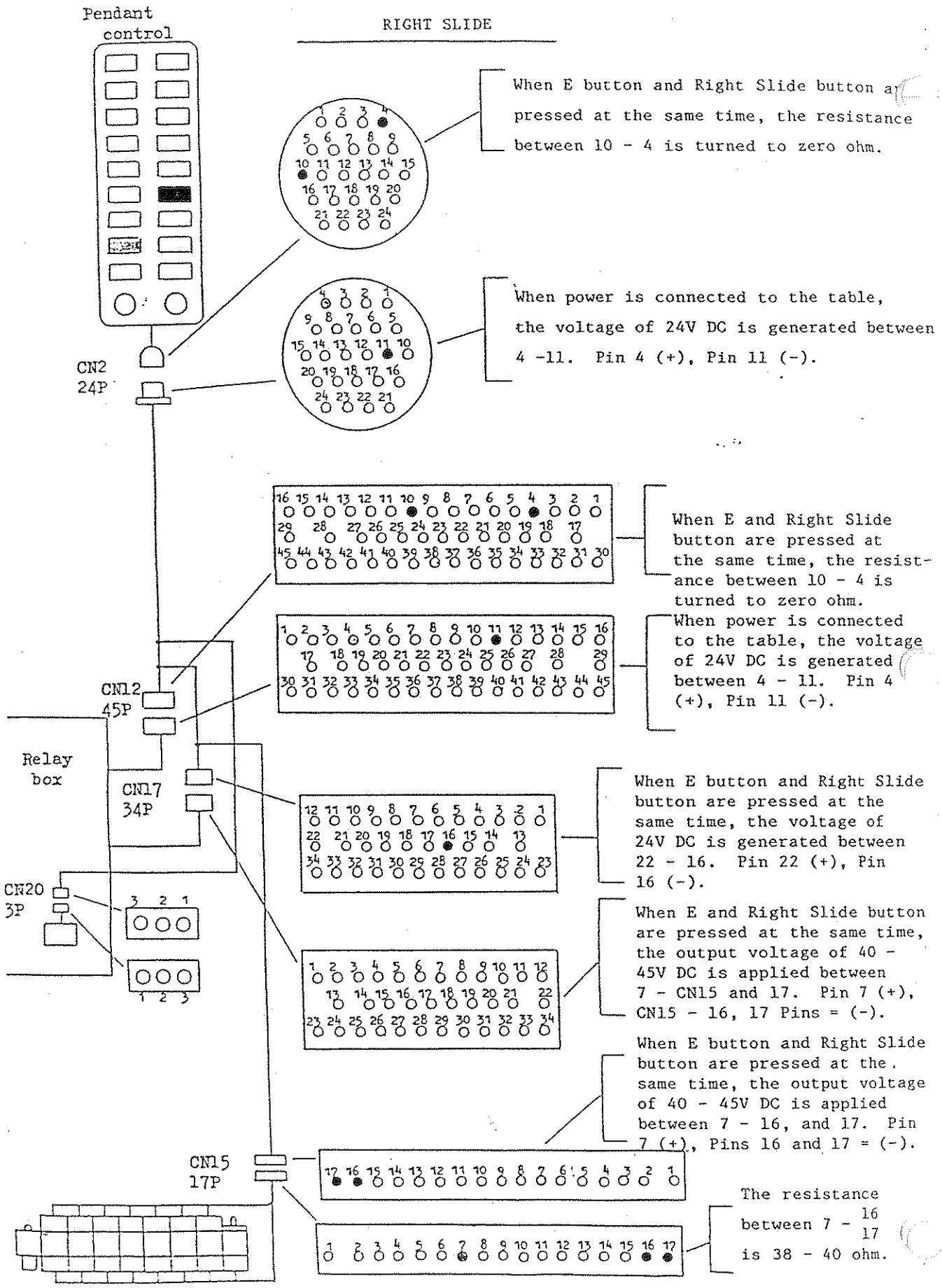
BACK REST (DOWN)


Pendant control
When E button and Back Rest Down button are pressed at the same time, the resistance between 10 - 2 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 2 -11. Pin 2 (+), Pin 11 (-).
CN2 24P
When E and Back Rest Down button are pressed at the same time, the resistance between 10 - 2 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 2 - 11. Pin 2 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Back Rest Down button are pressed at the same time, the voltage of 24V DC is generated between 24 - 16. Pin 24 (+), Pin 16 (-).
CN20 3P
When E and Back Rest Down button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 11 - CN15 and 17. Pin 11 (+), CN15 - 16, 17 Pins = (-).
When E button and Back Rest Down button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 11 - 16, and 17. Pin 11 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 16 17 is 38 - 40 ohm.

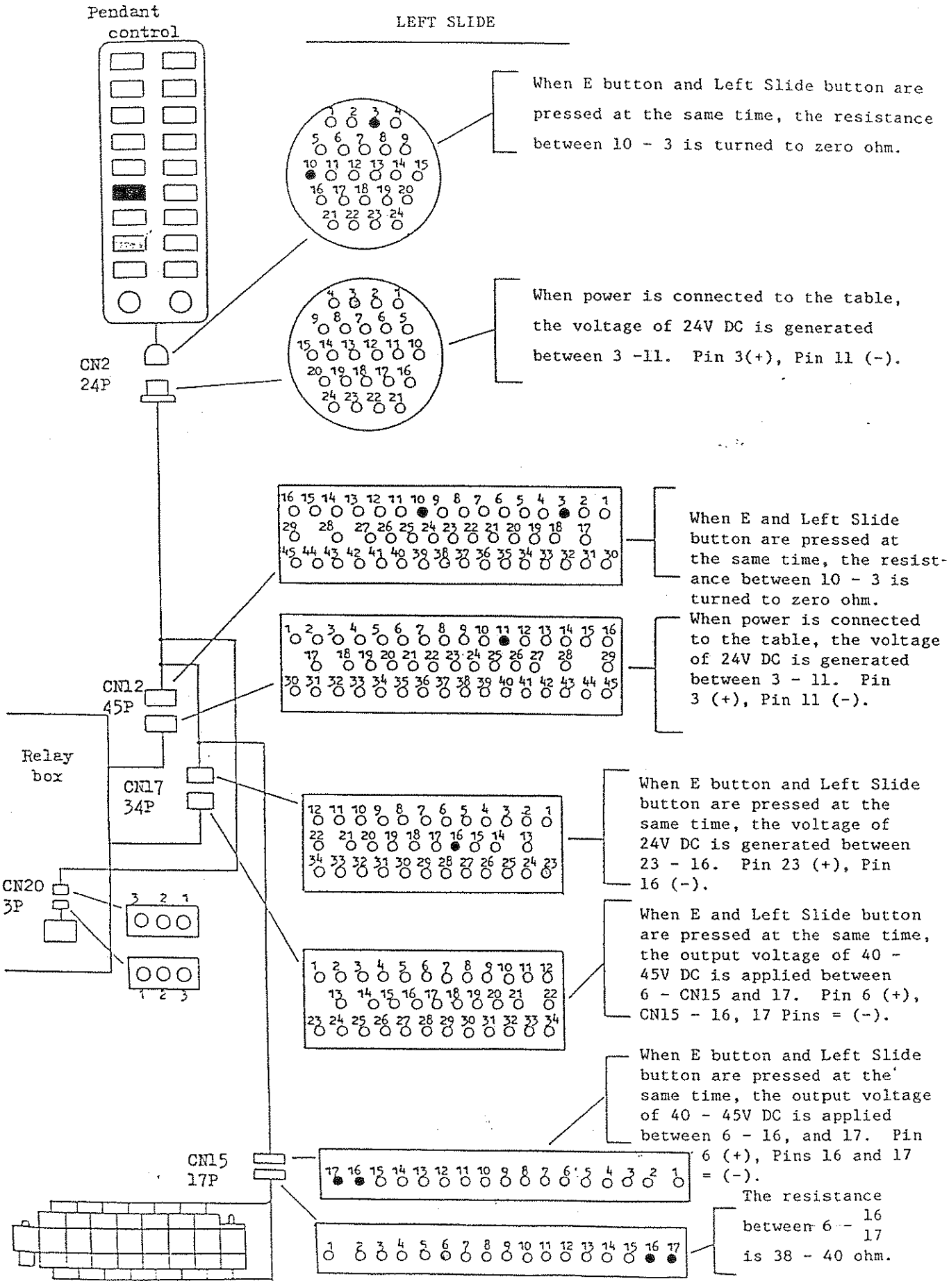
ASCENT

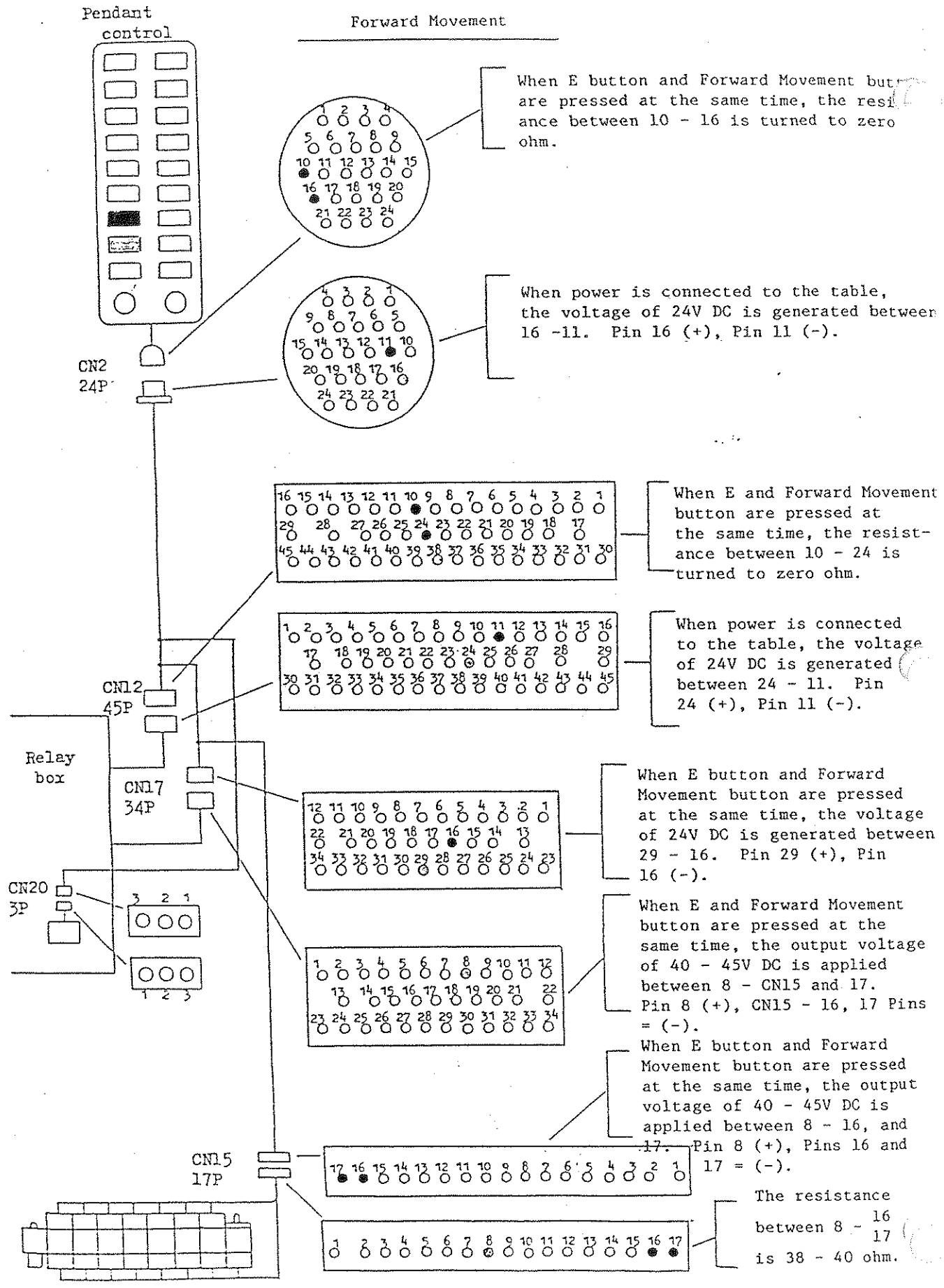

Pendant control
When E button and Ascent button are pressed at the same time, the resistan between 10 - 7 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 7 -11. Pin 7 (+), Pin 11 (-).
CN2 24P
When E and Ascent button are pressed at the same time, the resistance between 10 - 7 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 7 - 11. Pin 7(+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Ascent button are pressed at the same time, the voltage of 24V DC is generated between 19 - 16. Pin 19 (+), Pin 16 (-).
CN20 3P
When E and Ascent button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 2 - CN15 and 17. Pin 2 (+), CN15 - 16, 17 Pins = (-).
When E button and Ascent button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 2 - 16, and 17. Pin 2 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 2 - 16 17 is 38 - 40 ohm.

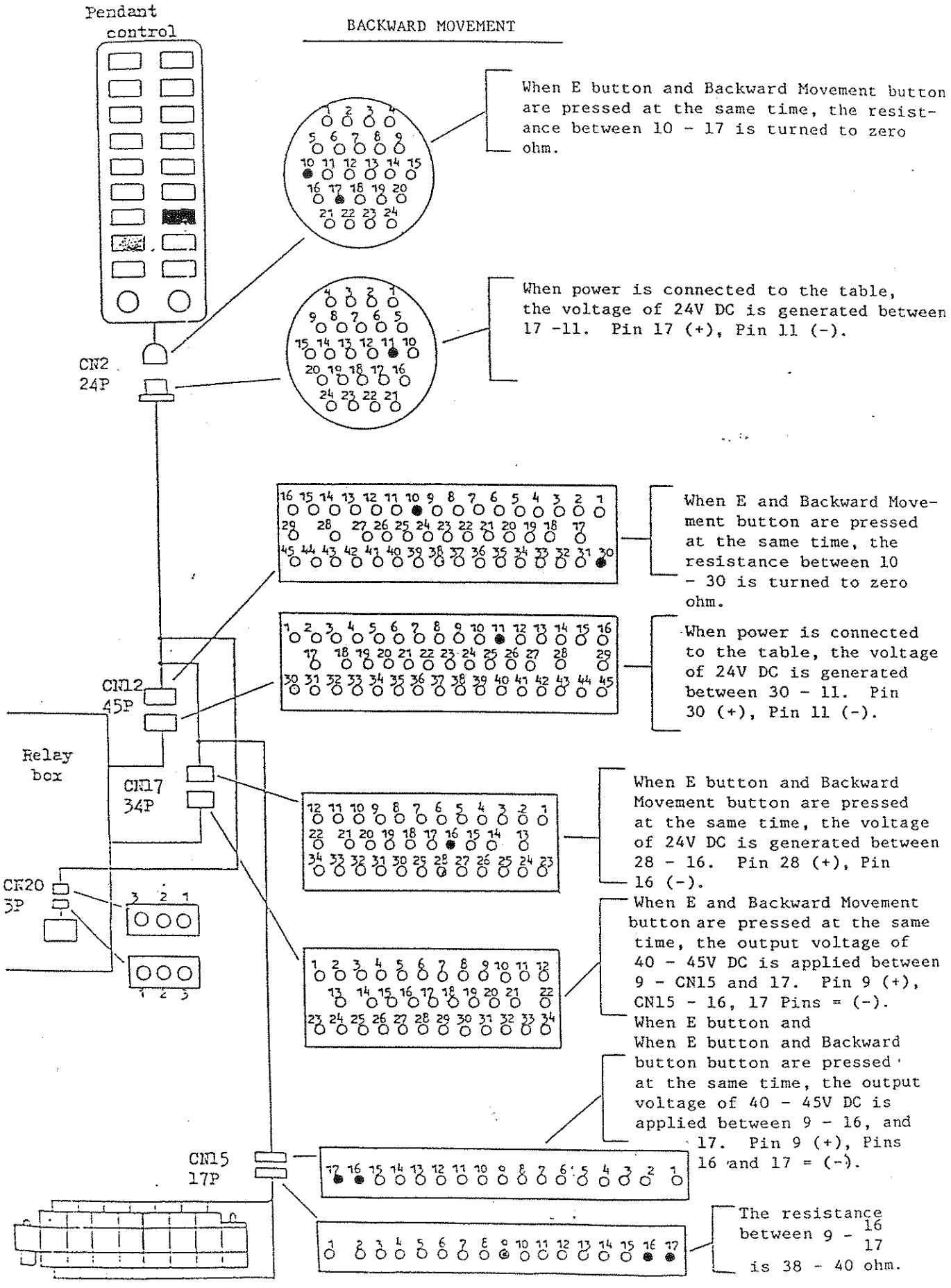

Pendant control
DESCENT (DOWN)
When E button and Descent button are pressed at the same time, the resistance between 10 - 8 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 8 -11. Pin 8 (+), Pin 11 (-).
CN2 24P
When E and Descent button are pressed at the same time, the resistance between 10 - 8 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 8 - 11. Pin 8 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Descent button are pressed at the same time, the voltage of 24V DC is generated between 8 - 16. Pin 8 (+), Pin 16 (-).
CN20 3P
When E and Descent button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 3 - CN15 and 17. Pin 3 (+), CN15 - 16, 17 Pins = (-).
When E button and Descent button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 3 - 16, and 17. Pin 3 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 3 - 16 17 is 38 - 40 ohm.

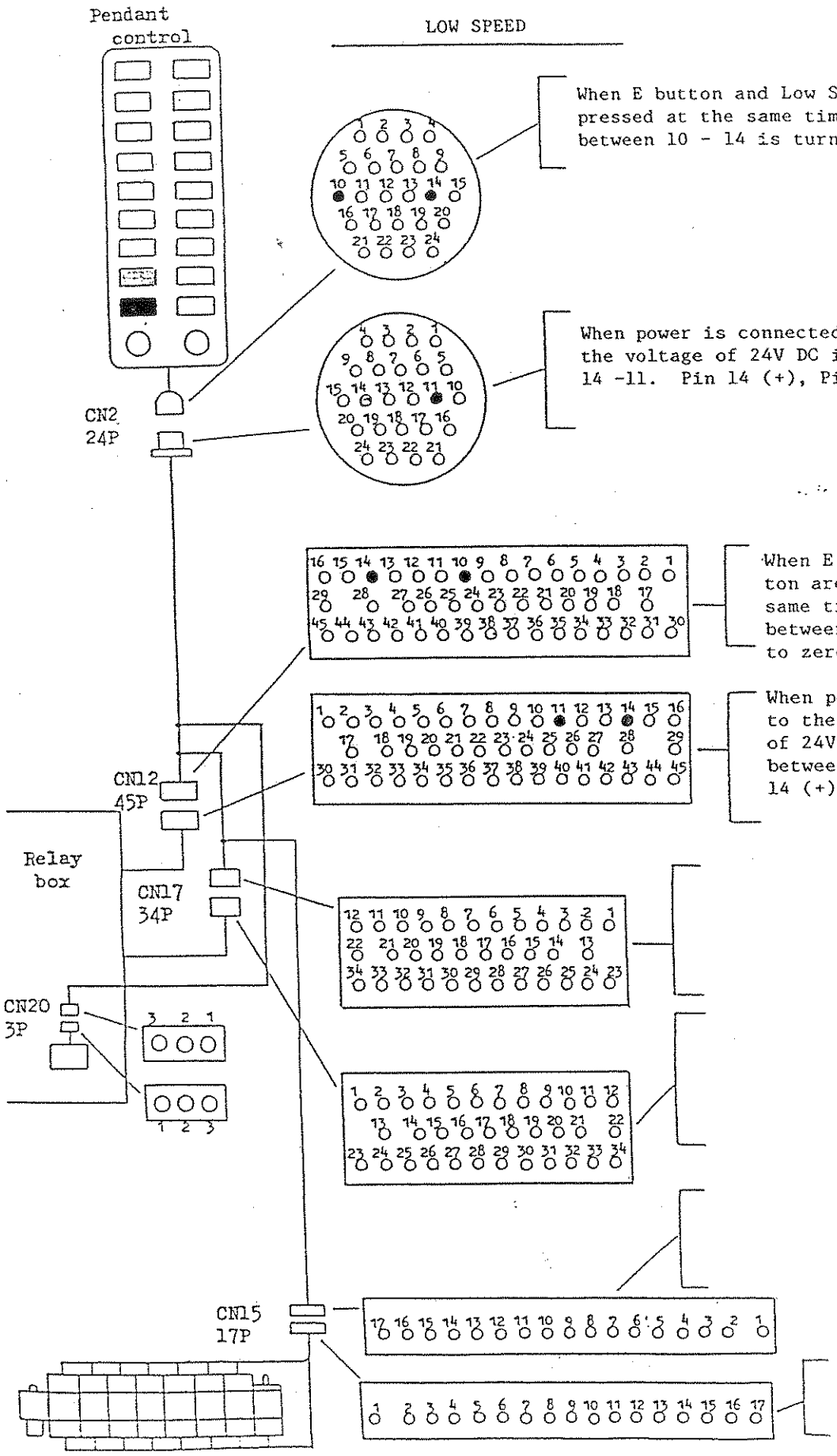

Pendant control
RIGHT SLIDE
When E button and Right Slide button are pressed at the same time, the resistance between 10 - 4 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 4 -11. Pin 4 (+), Pin 11 (-).
CN2 24P
When E and Right Slide button are pressed at the same time, the resistance between 10 - 4 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 4 - 11. Pin 4 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Right Slide button are pressed at the same time, the voltage of 24V DC is generated between 22 - 16. Pin 22 (+), Pin 16 (-).
CN20 3P
When E and Right Slide button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 7 - CN15 and 17. Pin 7 (+), CN15 - 16, 17 Pins = (-).
When E button and Right Slide button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 7 - 16, and 17. Pin 7 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 7 - 16 17 is 38 - 40 ohm.

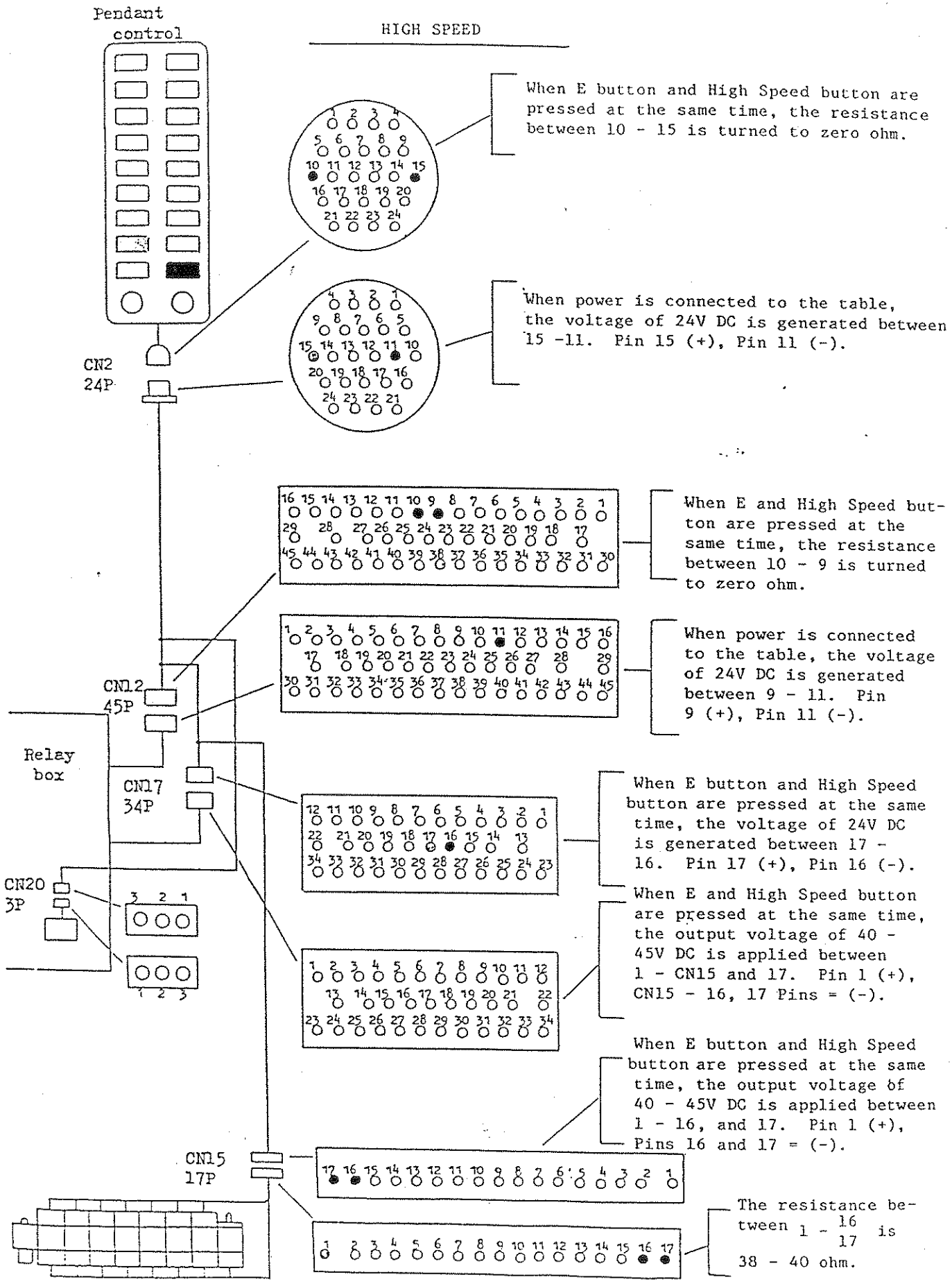
LEFT SLIDE


Pendant control
CN2 24P
When E button and Left Slide button are pressed at the same time, the resistance between 10 - 3 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 3 -11. Pin 3(+), Pin 11 (-).
CN12 45P
When E and Left Slide button are pressed at the same time, the resistance between 10 - 3 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 3 - 11. Pin 3 (+), Pin 11 (-).
Relay box
CN17 34P
When E button and Left Slide button are pressed at the same time, the voltage of 24V DC is generated between 23 - 16. Pin 23 (+), Pin 16 (-).
CN20 3P
When E and Left Slide button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 6 - CN15 and 17. Pin 6 (+), CN15 - 16, 17 Pins = (-).
When E button and Left Slide button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 6 - 16, and 17. Pin 6 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 6 - 16 17 is 38 - 40 ohm.

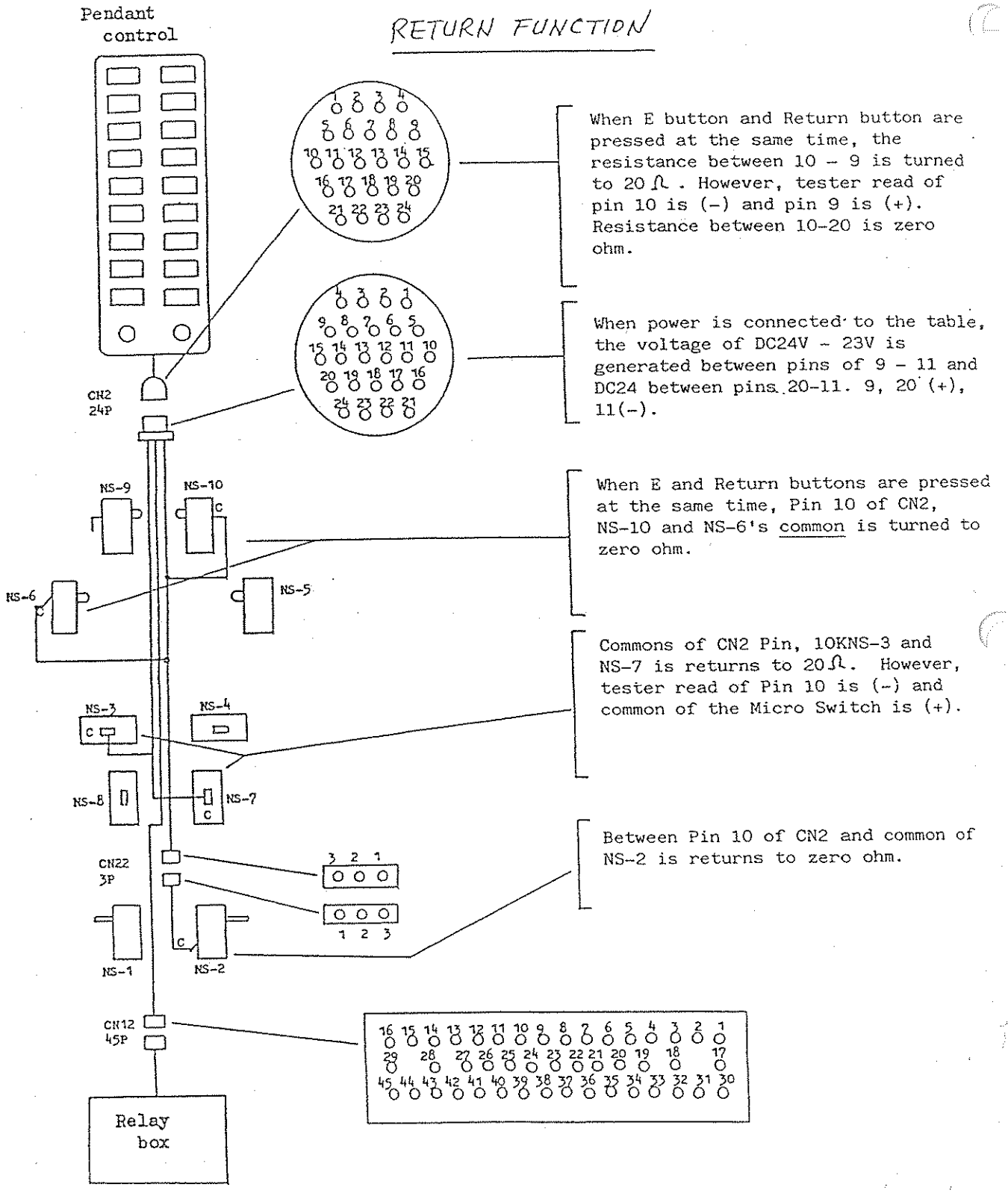

Pendant control
Forward Movement
When E button and Forward Movement button are pressed at the same time, the resistance between 10 - 16 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 16 -11. Pin 16 (+), Pin 11 (-).
CN2 24P
When E and Forward Movement button are pressed at the same time, the resistance between 10 - 24 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 24 - 11. Pin 24 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Forward Movement button are pressed at the same time, the voltage of 24V DC is generated between 29 - 16. Pin 29 (+), Pin 16 (-).
CN20 3P
When E and Forward Movement button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 8 - CN15 and 17. Pin 8 (+), CN15 - 16, 17 Pins = (-).
When E button and Forward Movement button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 8 - 16, and 17. Pin 8 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 8 - 16 17 is 38 - 40 ohm.


Pendant control
BACKWARD MOVEMENT
When E button and Backward Movement button are pressed at the same time, the resistance between 10 - 17 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 17 -11. Pin 17 (+), Pin 11 (-).
CN2 24P
When E and Backward Movement button are pressed at the same time, the resistance between 10 - 30 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 30 - 11. Pin 30 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and Backward Movement button are pressed at the same time, the voltage of 24V DC is generated between 28 - 16. Pin 28 (+), Pin 16 (-).
CN20 3P
When E and Backward Movement button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 9 - CN15 and 17. Pin 9 (+), CN15 - 16, 17 Pins = (-).
When E button and
When E button and Backward button button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 9 - 16, and 17. Pin 9 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 9 - 16 17 is 38 - 40 ohm.

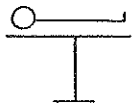
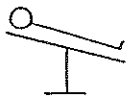
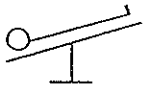
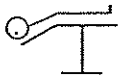
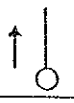
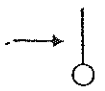

Pendant control
LOW SPEED
When E button and Low Speed button are pressed at the same time, the resistance between 10 - 14 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated betwee 14 -11. Pin 14 (+), Pin 11 (-).
CN2 24P
When E and Low Speed button are pressed at the same time, the resistance between 10 - 14 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 14 - 11. Pin 14 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
CN20 3P
CN15 17P


Pendant control
HIGH SPEED
When E button and High Speed button are pressed at the same time, the resistance between 10 - 15 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 15 -11. Pin 15 (+), Pin 11 (-).
CN2 24P
When E and High Speed button are pressed at the same time, the resistance between 10 - 9 is turned to zero ohm.
When power is connected to the table, the voltage of 24V DC is generated between 9 - 11. Pin 9 (+), Pin 11 (-).
CN12 45P
Relay box
CN17 34P
When E button and High Speed button are pressed at the same time, the voltage of 24V DC is generated between 17 - 16. Pin 17 (+), Pin 16 (-).
When E and High Speed button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 1 - CN15 and 17. Pin 1 (+), CN15 - 16, 17 Pins = (-).
CN20 3P
When E button and High Speed button are pressed at the same time, the output voltage of 40 - 45V DC is applied between 1 - 16, and 17. Pin 1 (+), Pins 16 and 17 = (-).
CN15 17P
The resistance between 1 - 16 / 17 is 38 - 40 ohm.

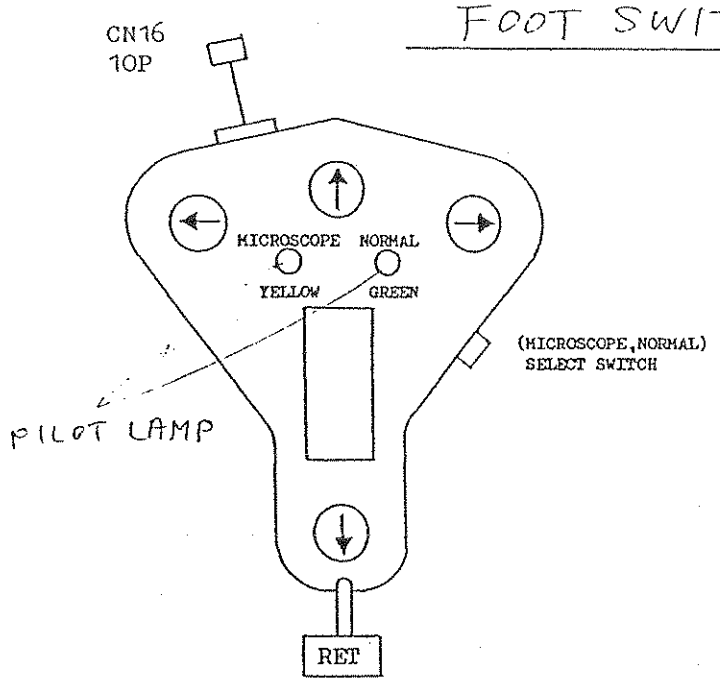
RETURN FUNCTION


Pendant control
CN2 24P
NS-9
NS-10
NS-6
NS-5
NS-3
NS-4
NS-8
NS-7
CN22 3P
NS-1
NS-2
CN12 45P
Relay box
When E button and Return button are pressed at the same time, the resistance between 10 - 9 is turned to 20Ω. However, tester read of pin 10 is (-) and pin 9 is (+). Resistance between 10-20 is zero ohm.
When power is connected to the table, the voltage of DC24V - 23V is generated between pins of 9 - 11 and DC24 between pins 20-11. 9, 20 (+), 11(-).
When E and Return buttons are pressed at the same time, Pin 10 of CN2, NS-10 and NS-6's common is turned to zero ohm.
Commons of CN2 Pin, 10KNS-3 and NS-7 is returns to 20Ω. However, tester read of Pin 10 is (-) and common of the Micro Switch is (+).
Between Pin 10 of CN2 and common of NS-2 is returns to zero ohm.

RETURN FUNCTION

Position of Table	CN 2 24P	CN 12 45P	Resistance Value
 When all at level position	9	17	∞
	9	34	∞
	20	38	∞
	20	16	∞
	20	20	∞
 At Head Up position	20	15	0
	20	16	∞
 Head Down Position	20	15	∞
	20	16	0
At Right Up position	20	37	∞
	20	38	0
Left Up position	20	37	0
	20	38	∞
When positioned at Back Rest Up	20	19	0
	20	20	∞
 Back Rest down	20	19	∞
	20	20	0
 For Forward movement	9	33	∞
	9	34	0
Backward movement	9	33	0
	9	34	∞
Left Slide	9	17	0
	9	18	∞
 Right Slide	9	17	∞
	9	18	∞

FOOT SWITCH



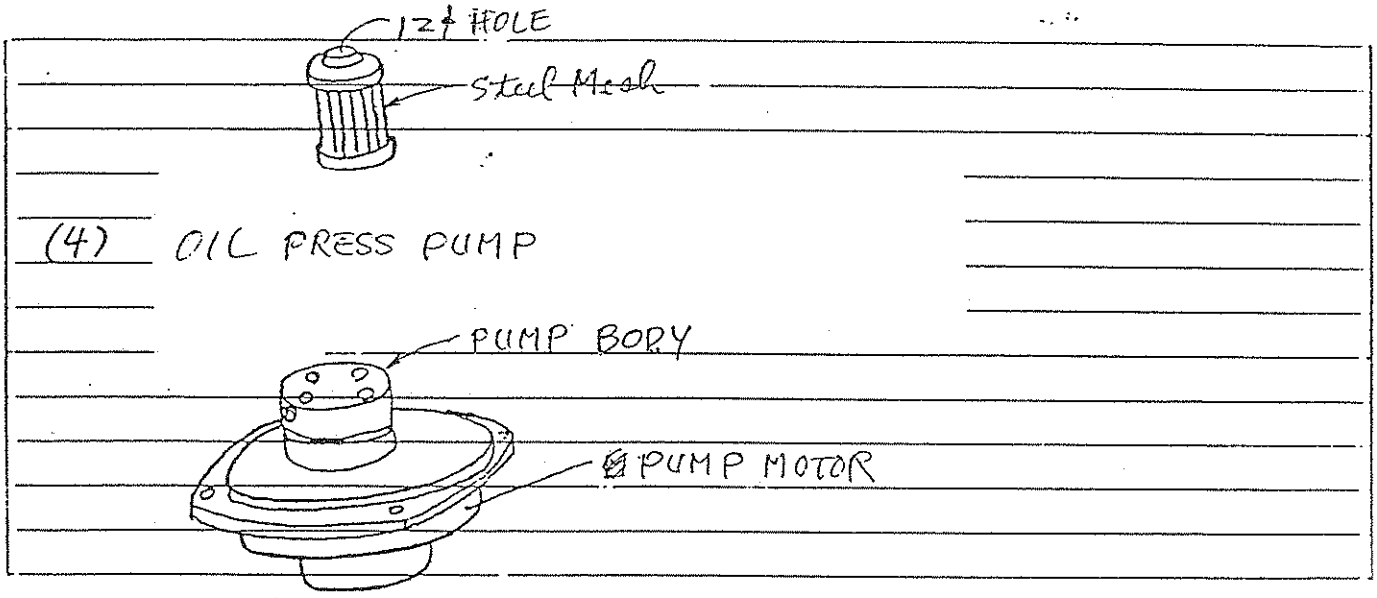
WHEN PRESSED

Microscope/Normal Changeover	Movement	CN 16 Pin No.		RESISTANCE VALUE
Normal Green Lamp is On	→ Right Slide	9	4	0
	← Left Slide	9	3	0
	↑ forward	9	6	0
	↓ Backward	9	5	0
Microscope (Yellow Lamp is on)	→ Table (Left Slide)	9	3	0
	← Table (Right Slide)	9	4	0
	↑ Table (Backward)	9	5	0
	↓ Table (Forward)	9	6	0
	Return	9	8	0

(1) WORKING OIL
Turbin Oil #90 or Similiar Unit.
(KYOSEKI HYDLUX 32#)

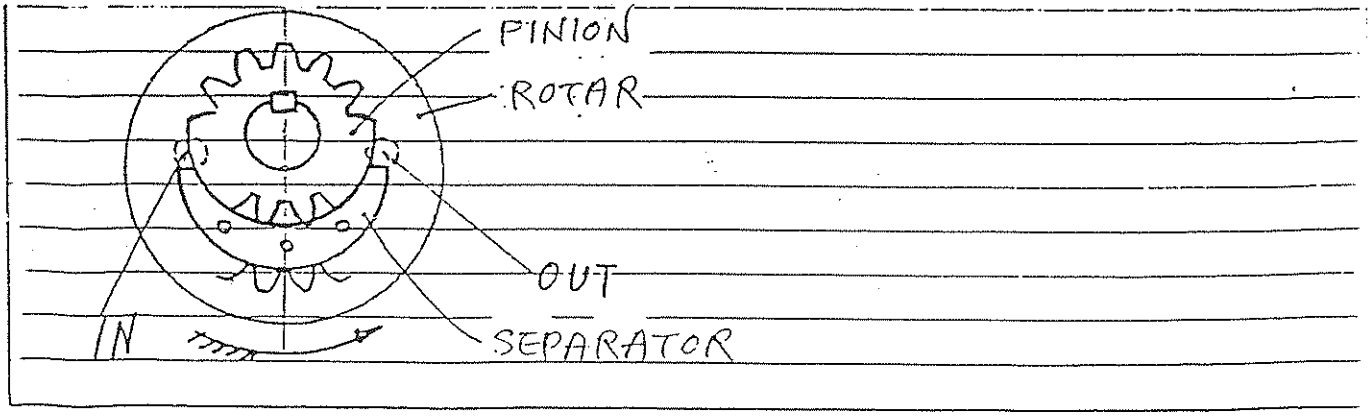
(2) WORKING OIL TANK
Capacity of Tank: 2 Litres.
Oil Volume: 1.8 Litres.

(3) FILTER
Size of Mesh: 100 Mesh
MATL: Stainless Steel



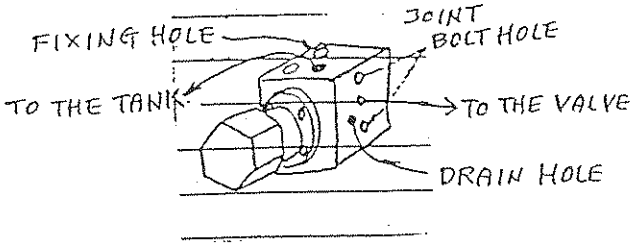
PUMP MOTOR
PC 42V 6.5A PC MOTOR (PRINTED MOTOR Made by Yasukawa Electric).

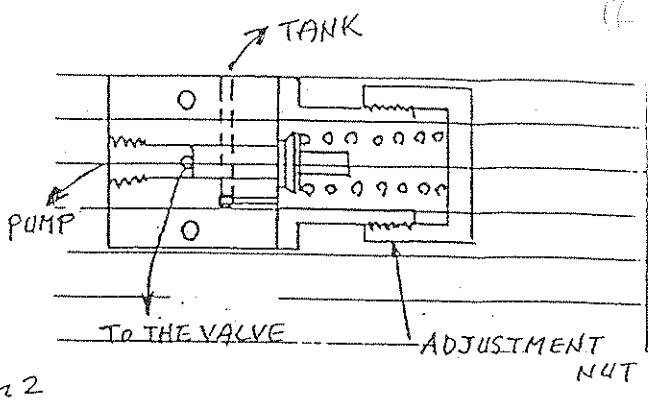
PUMP
Closed Gear System Volume of Vomit:600CC/Min Pressure 65Kg/cm2 3000RPM



MST-7000NB OIL PRESS (HYDRO) PARTS

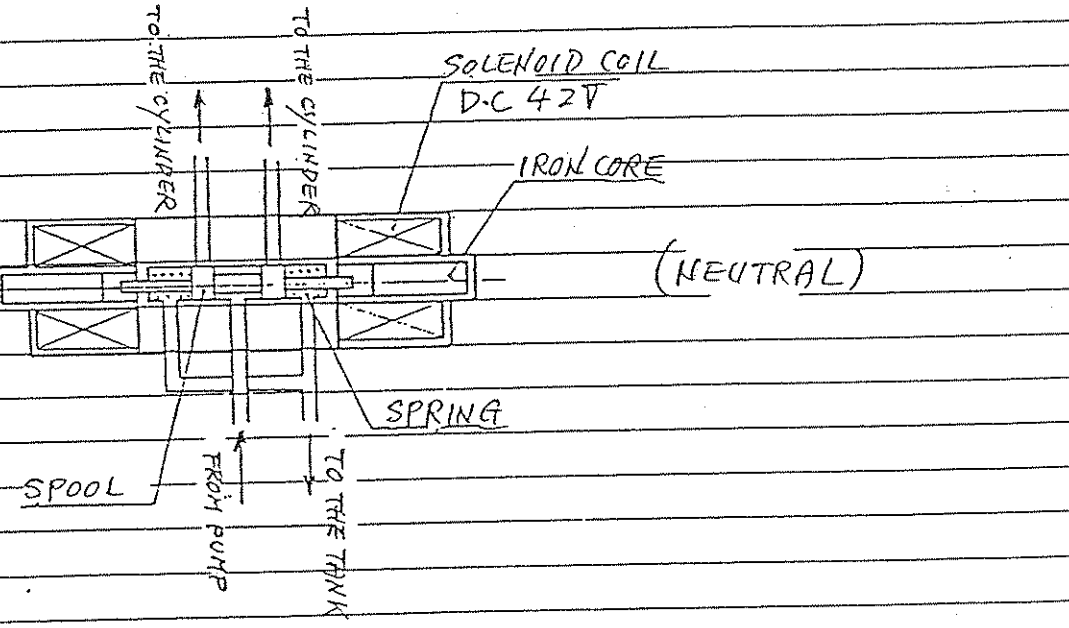
(5) RELIEF VALVE (HYDRO CUSHION TYPE)

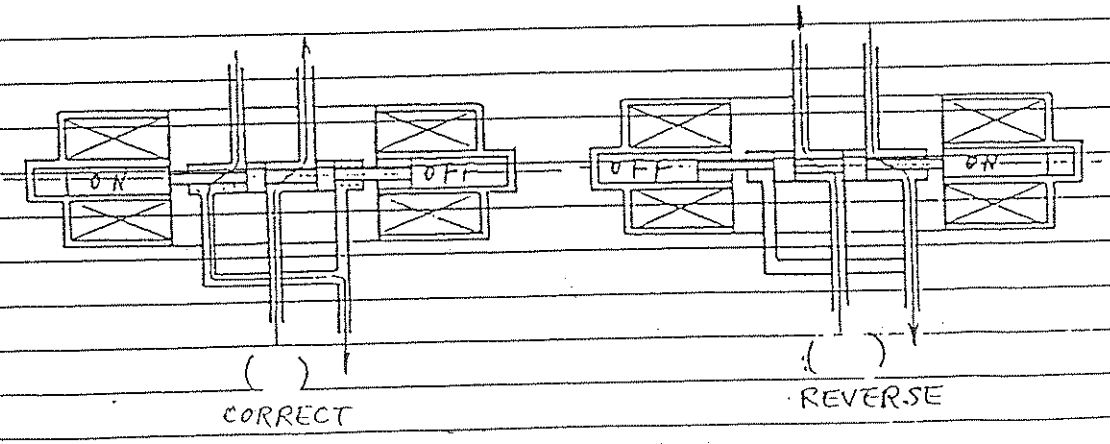




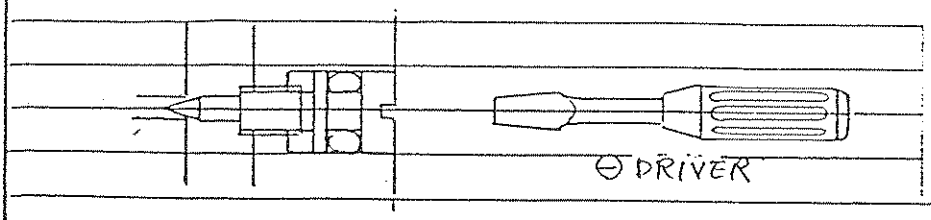
WORKING ADJUSTMENT PRESSURE:
65 KG/Cm 2

(6) DIRECTION CHANGEOVER VALVE (VALVE)





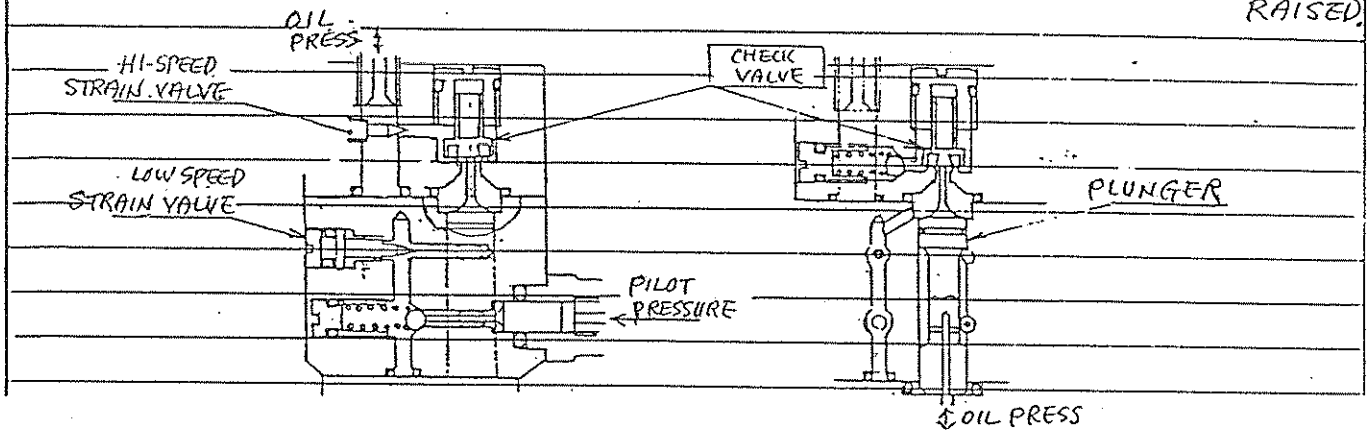
(7) SQUEEZE VALVE (FOR CYLINDER'S SPEED ADJUSTMENT)



CLOSE BY TURNING CLOCKWISE.

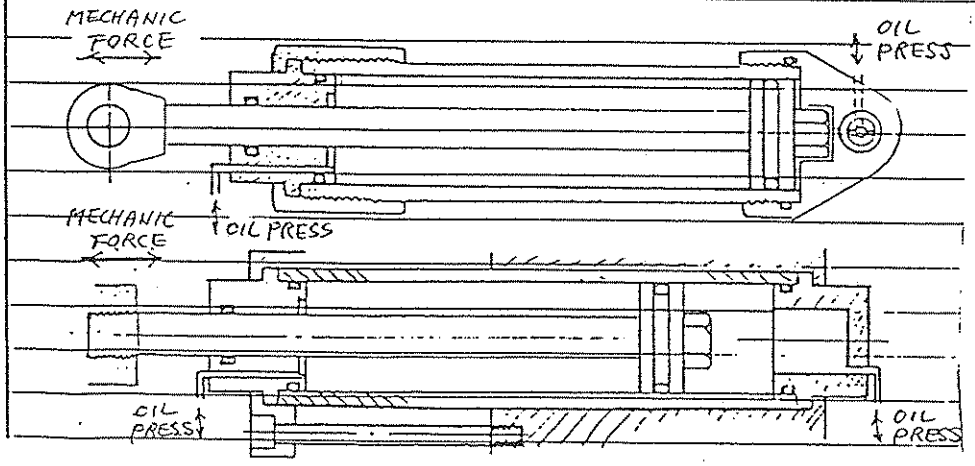
RELEASE BY TURNING ANTI-CLOCKWISE.

(8) CHECK (NON-RETURN) VALVE (FOR THE PURPOSE TO LOCK UP THE OIL ENTERED INTO THE CYLINDER). IT WILL BE RELEASED WHEN PUMP PRESSURE IS RAISED.



Identical circuit is constituted for the reverse side. However, lower main unit is only with pilot piston for Brake System.

(9) OIL PRESS CYLINDER



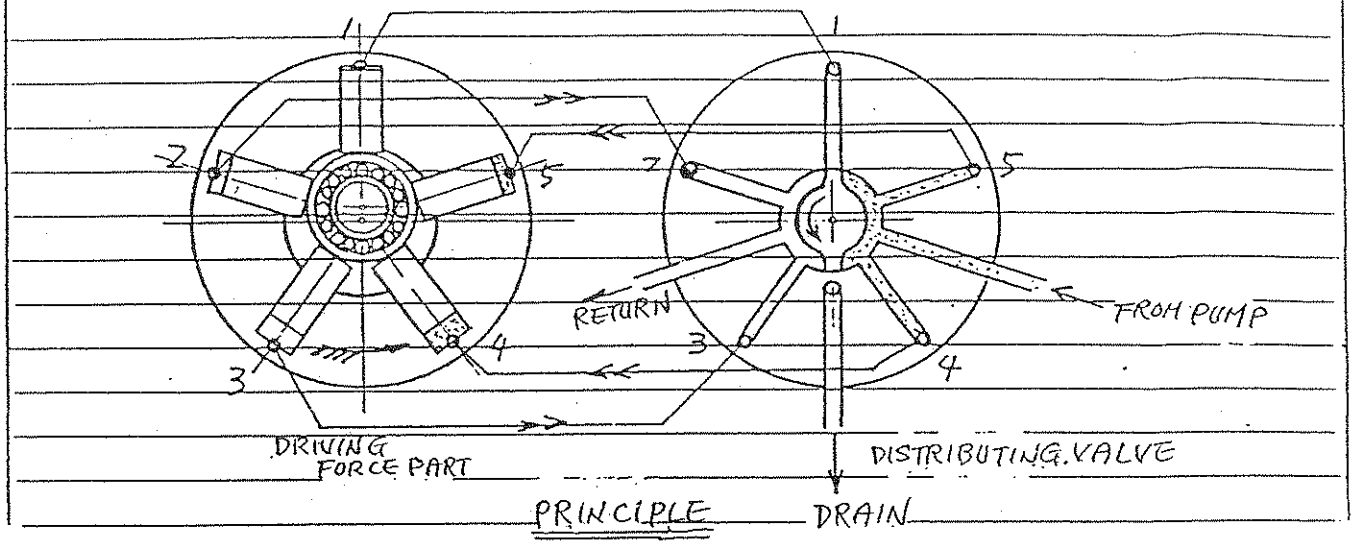
UP/DOWN CYLINDER

TREND. CYLINDER

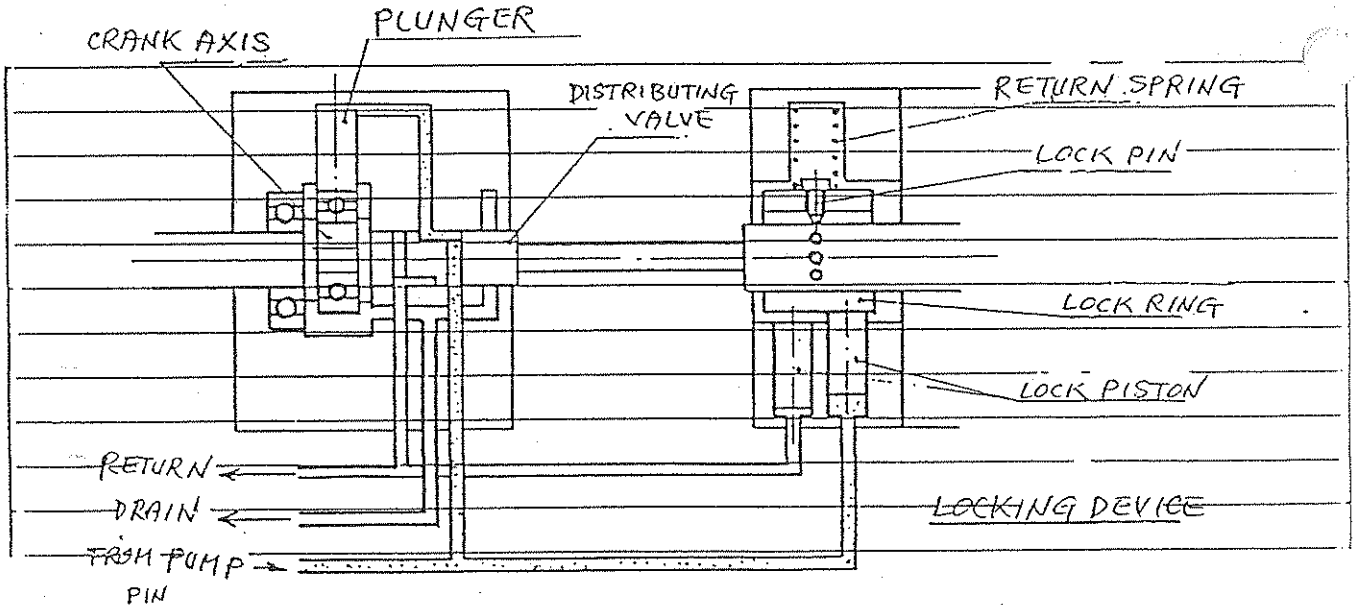
This is a device to change the oil hydraulic pressure to the powerful mechanical force.

MST-7000 NB OIL PRESS HYDRO PARTS

(10) OIL PRESSURE MOTOR & LOCKING DEVICE



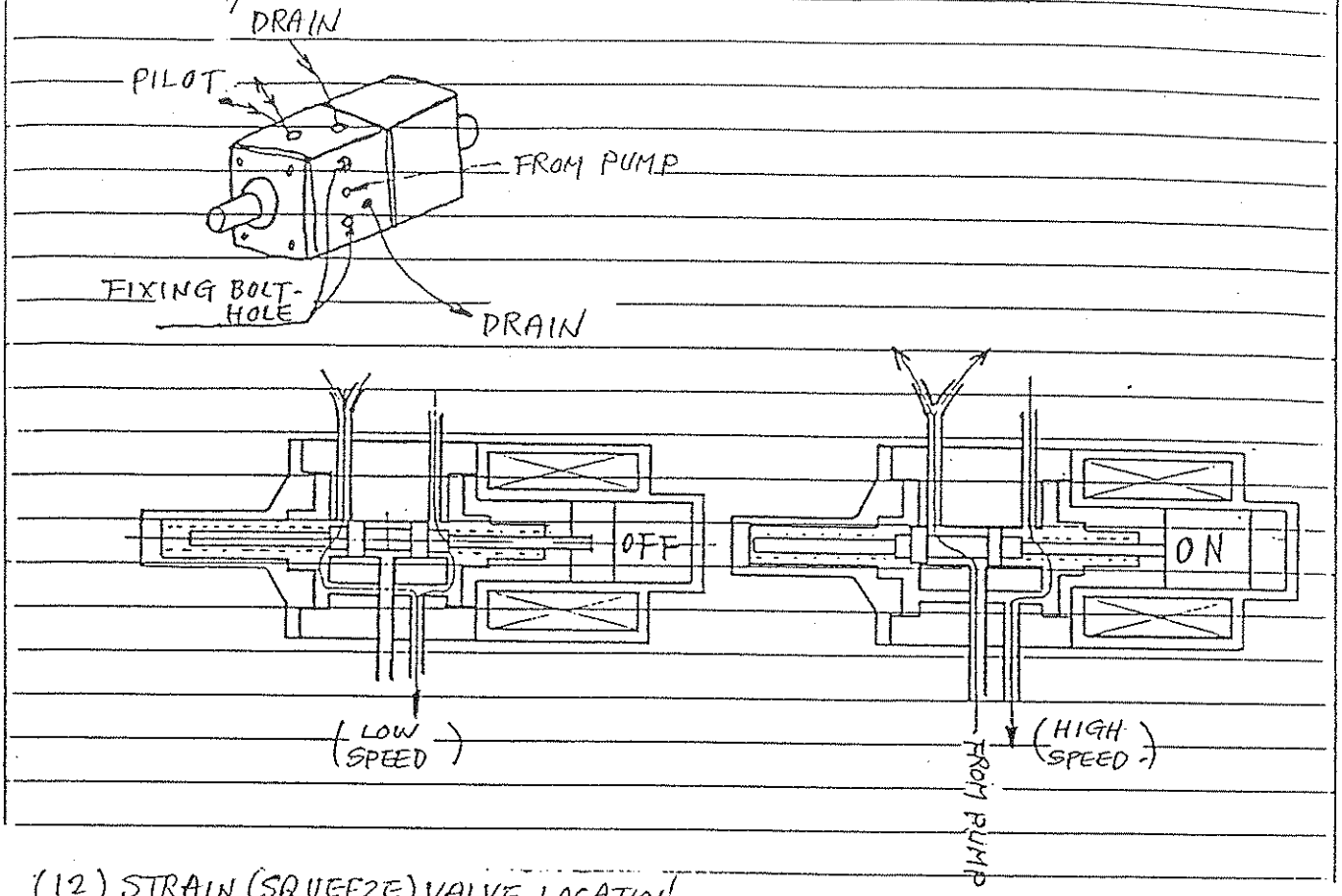
Pressed oil is passed through the distributing valve and push Piston 4 and Piston 5 and then rotate the rotation axis toward anti-clockwise and the distributing valve in the same axis also be rotated. Since the pressed oil is actuated in orderly like 1 → 2 → 3 and continue the rotation.



PIN

Lock of the Locking Device is dropped in the hole by the return spring when pressure is not applied but once pressure is applied on the oil, it will be pushed out by the lock piston and turned to the condition of rotation.

(11) HIGH/LOW SPEED CHANGEOVER VALVE (PILOT VALVE)



(12) STRAIN (SQUEEZE) VALVE LOCATION

Adjust the black screws located on both side of the valve by using ⊖ driver. Speed will be increased by turning it to clockwise and the speed will be decreased if turning it to anti-clockwise.